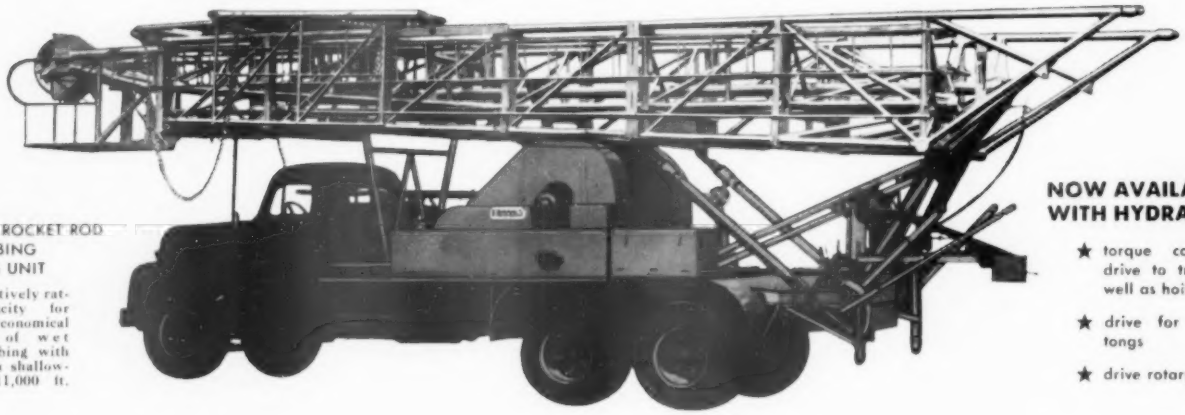
the OIL AND GAS JOURNAL

FRANKS MFG. CORP. WELL SERVICING AND DRILLING UNITS

King of Well Servicing Units



FRANKS ROCKET ROD AND TUBING PULLING UNIT

Conservatively rated capacity for most economical hoisting of wet string tubing with rods from shallowest to 11,000 ft. wells.

NOW AVAILABLE WITH HYDRAULIC

- ★ torque converter drive to truck as well as hoist
- ★ drive for power tongs
- ★ drive rotary table

Why 1. Superintendents Prefer Franks
2. Contractors Make Money with Franks

In well servicing its the end results that count—results for both contractor and company. Many companies are paying contractors more per hour to use Franks units, because these companies know they get faster rig-up and down, faster pulling, and, therefore, pay less in the end. Contractors also find this advantageous for they can keep their Franks units busier and, therefore, get more contract work in the end. Contractors also benefit from the Franks faster moving and from Franks exclusive "on the spot field service" which eliminates excessive repair time out. Then, too, contractors benefit further because they never have a Franks idle in their yards waiting for a more preferred unit to come in from another job. Franks, being preferred by superintendents, is in constant demand. This all adds up to the fact that Franks costs less in the long run, both to contractors and companies.

Franks is not *Among* the Best, But *The* Best.

Investigate Franks before you buy.

Star Features

- ★ No guy line rigging
- ★ Legal in weight
- ★ Fastest rig up and down
- ★ Franks famous hoist. Smoothest high capacity clutch yet developed. Hydraulically adjusted—Air controlled
- ★ Hydraulically adjusted and equalized brakes
- ★ Franks famous power take-off

Only FRANKS offers "on the spot" field service with stock of parts and factory trained personnel available at Alice, Compton, Casper, Farmington, Great Bend, Houston, Kilgore, Odessa, Seminole, Edmonton, and Tulsa.

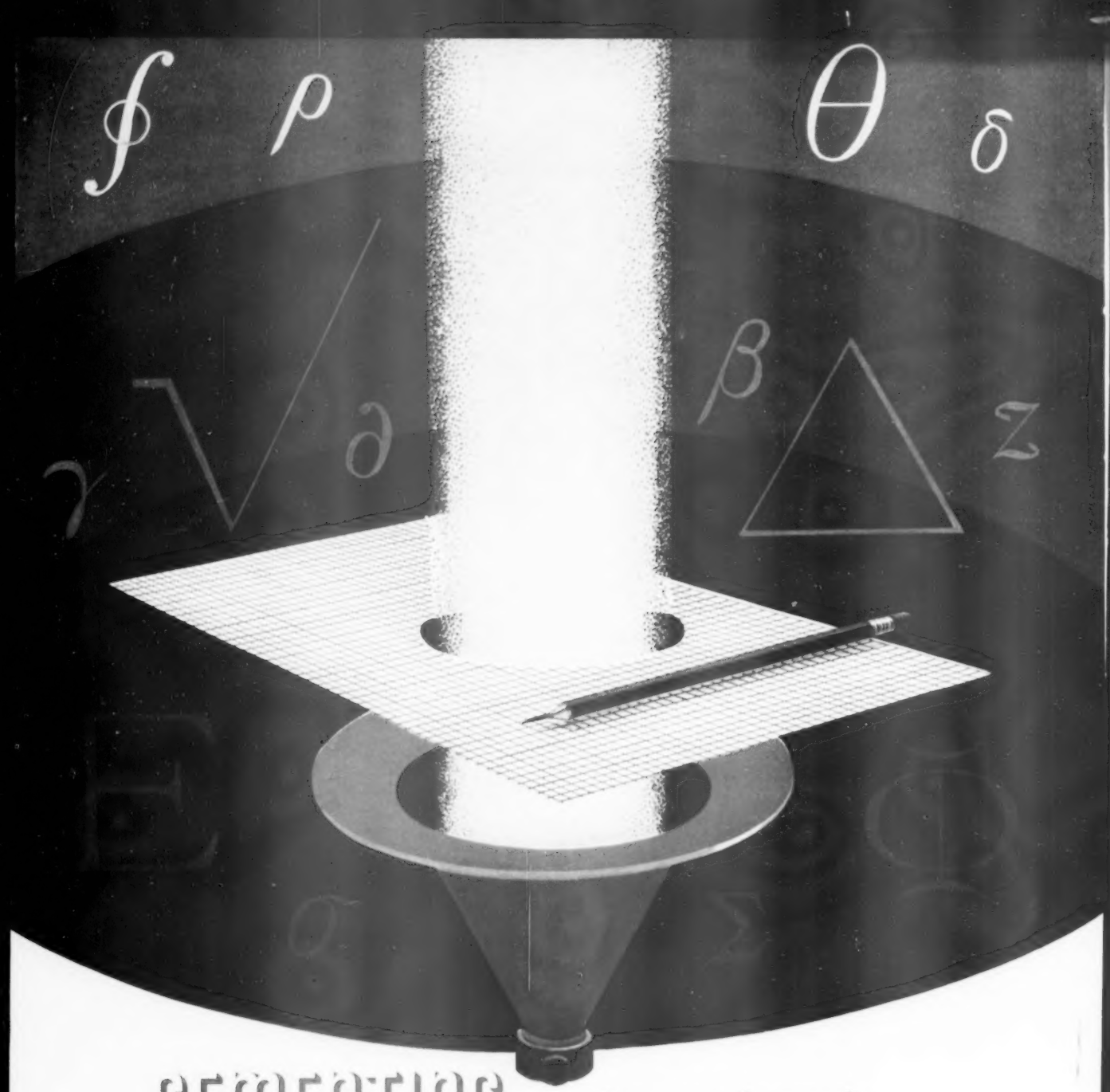
FRANKS MFG. CORP. WELL SERVICING AND DRILLING UNITS TULSA, OKLAHOMA

"On the SPOT" FIELD SERVICE

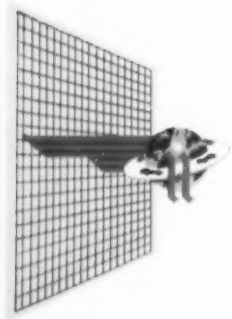
Franks Mfg. Corp.
Box 3218, Whittier Station
Tulsa, Oklahoma

Export 149 Broadway, New York, N. Y.

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 FEBRUARY 1, 1954



CEMENTING ... has no formula



A million jobs ago we learned no two wells were alike. And a quarter century of research finds no formula for cementing. Well completions side by side still have separate problems. The solution requires most careful analysis—of bore hole, drilling fluids, well conditions, formations, temperatures, depths, and differences in drilling practices. Then highly specialized tools, materials, and techniques are selected for each job. Such analysis has made cementing more and more successful. Operators regard it as a critical point in the history of a well. And geologists realize cementing is an important production tool. This has been established by the world's most experienced cementers, who find that cementing has no formula.

HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"

the OIL AND GAS JOURNAL

FEBRUARY 1, 1954 VOL. 52 NO. 39

OIL IN THE NEWS . . .

Importers, Former I.P.A.A. President Talk About Foreign Oil 38
Shell Rig Claims All-Time Rotary Drilling Record 38
Symonds Says Field Price of Gas Will Be 3 Cents Higher in 1954 . . 38
Octane Numbers of Both Premium and Regular Gasoline Still Going Up 39
Thompson Foresees Another Bright Year for Oil Industry 40
Two Significant Completions Chalked up for Skeels Field in Michigan . . 40
High Costs Offset Cheap Oil in Middle East, Jennings Says 41
Stanolind Stakes First Test in Federally Owned Continental Shelf . . 42
Nolan County Cambrian Discovery Extends Trend of Texas Fields 44
Reshooting, Reworking, Redrilling Are Adding New Pays in Old Areas . . 44
Texas Railroad Commission Approves Andrews County Unit Agreement . . 44
Imports Will Follow Normal Seasonal Trend and Decrease by May 46
November Imports of Residuals Reach Highest Point Since March 46
Southern Production Signs Deal to Explore 4 Million Acres in Canada . . 47
Randall Commission Report Dodges Issue of Oil Imports and Quotas 48
Gas Executives Expected to Turn Down Defense Pipe-Line Project 49
House Committee Expected to Make No Change in Depletion Allowance . . 50
Mississippi Has Lower Tuscaloosa Discovery in Deep Embayment 54

TECHNOLOGY AND OPERATION . . .

[1]All-Electric Rig Drilling in Ventura Field 64
By Martin Mears and C. J. Manner

Automatic Sampling of Hydrocarbons 68
By W. E. Gibson

[2]Okmulgee Refinery Cat Cracker 70
By J. C. Reidel

[3]Why Storage Tanks Fail 73
By F. J. Feely and M. S. Northup

[4]Condensate Extraction by Refrigeration 78
By D. E. McFaddin

[5]Packaged Compressor Plants 81
By E. S. McRoberts

Hidden Dome Field, Wyoming 85
By J. A. Kornfeld

When Pipe Lines Take a Water Route—Part 2 86
By P. H. Timothy

EXPLORATION . . .

Renaissance in East Texas? 123
Jurassic Strike Steps Up East Texas Search 124
Area Field Reports 128

NEWS FEATURES . . .

They Say 27
Calendar of Events 28
Journally Speaking 33
Editorial 35
This Week 37
Watching Washington 49
International News 56
Personals 61
Deaths in the Industry 63
Pipe-Line News 109
Refining News 112
Refinery Construction Index 112
Petrochemical News 114
Natural-Gas News 119
Natural-Gasoline News 119
Exploration Statistics 139
Production Statistics 140
Refining Statistics 141
Market Statistics 142

DEPARTMENTS . . .

On the Job In the Fields 88
Pipe-Line Patrol 90
Engineering Reference 92
Instruments 93
Field Processing 95
Refiner's Notebook 97
Progress in Metals 98
Equipment Digest 101
Equipment Men in News 107-146
Classified Advertising 143
Advertiser's Index 147

FIELDS . . .

Drilling Contractors 117
Active Rotary Rigs 118
Area Field Reports 128

In Brief . . .

1. **ELECTRIC DRILLING . . .** A completely electric 1,500-hp. drilling rig was installed recently by Tide Water Associated Oil Co. in the Ventura Avenue field. This rig combines the advantages of the electric utility power system and the d.c. variable voltage drive. The improved performance at both high speeds and high torques means faster operation when coming out of or going into the hole, so that more time is spent on bottom.

2. **REFINERY EXPANSION . . .** Phillips Petroleum Co. at its Okmulgee, Okla., refinery has installed a nominal 8,000-bbl. per day T.C.C. unit, a new feed preparation unit and gas-recovery plant. It is anticipated that former throughput of 8,600 bbl. per day will be raised to above 15,000 bbl. per day. One interesting feature of the gas recovery unit is the deethanizing absorber which is designed to recover 80-85 per cent propane fraction.

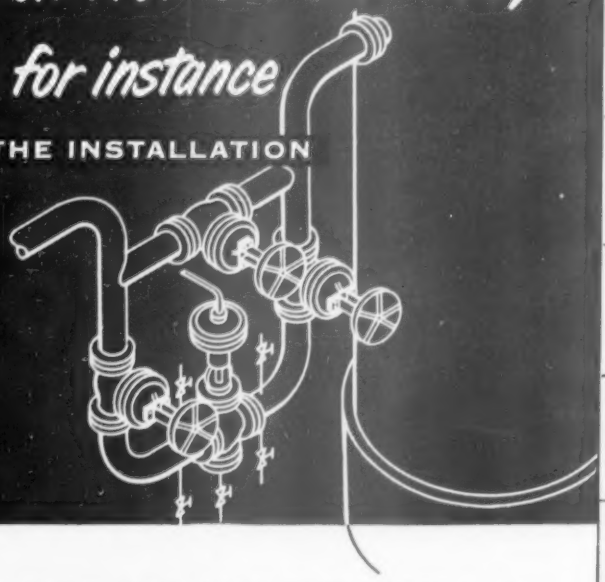
3. **WHY STORAGE TANKS FAIL . . .** Investigation of tank failures by an A.P.I. committee in this country has focused attention on this subject. Here is a report of two rather unusual tank failures which occurred in England. Both of the failures were started by welding defects of appreciable size. It was indicated that a steel having better impact properties was required.

4. **CONDENSATE EXTRACTION . . .** Low-temperature extraction plants have been built for operation in both the Mid-Continent and California. This is a low-investment means to obtain a reduced extraction of liquid components in natural-gas processing. One type of unit effectively recovers pentanes and heavier.

5. **PACKAGED COMPRESSORS . . .** Applications are discussed of complete, factory-assembled units, compact enough to be transported on an oil-field truck. Savings may be achieved in using such units in oil and gas production as well as in other applications.

You Can Measure this Valve's Quality on Hot Oil Service, for instance

THE INSTALLATION



In a leading lube oil plant on the Gulf Coast, using Crane Steel Valves on hot oil extraction lines from tower in Duo-Sol unit. Working pressure 100 psi at 850 degrees F.

VALVE SERVICE RATINGS

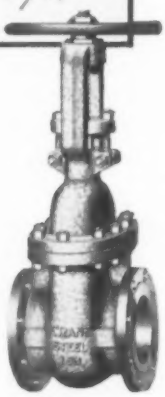
SUITABILITY:	Couldn't be better
FEATURES:	Exelloy trim
MAINTENANCE COST:	Routine service only
SERVICE LIFE:	No efficiency loss since 1951
OPERATING RESULTS:	Safe, dependable control
AVAILABILITY:	Catalog item — No. 47X

THE CASE HISTORY

Valves formerly used here were identical in design and appearance with their Crane replacements. But the similarity ended there. For they gave continual trouble in this round-the-clock process. Sticking discs made them extremely difficult to operate. They failed to hold tight on closure. Their replacement became mandatory for efficient operation.

It's been a different story since Crane 47X steel gates were installed almost 2 years ago. No more sticking of discs . . . no leakage anywhere . . . and with only routine maintenance.

THE VALVE



Work horse of the petroleum industry—Crane 150-pound steel gates—with exceptional performance assured by Crane quality design . . . Crane metallurgy . . . and the high adaptability of Crane Exelloy trim for oil and oil vapor services. Sizes 2 to 24 in.; screwed, flanged, welding ends. See your Crane Catalog or Crane Representative.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

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Branches and Wholesalers Serving All Industrial Areas

VALVES · FITTINGS · PIPE · PLUMBING · HEATING

How to *INCREASE BOILER RATINGS*

with your present furnace and stack

Coppus-Dennis FANMIX Burners Give You More Heat with No Other Major Change in Equipment

Coppus-Dennis **FANMIX** Burners give you *perfect* mechanical mixing of fuel and air *at the burner outlet . . . instantaneous* ignition close to the burner . . . and *complete* combustion *without visible flame* when burning natural gas. No other burner combines these three advantages.

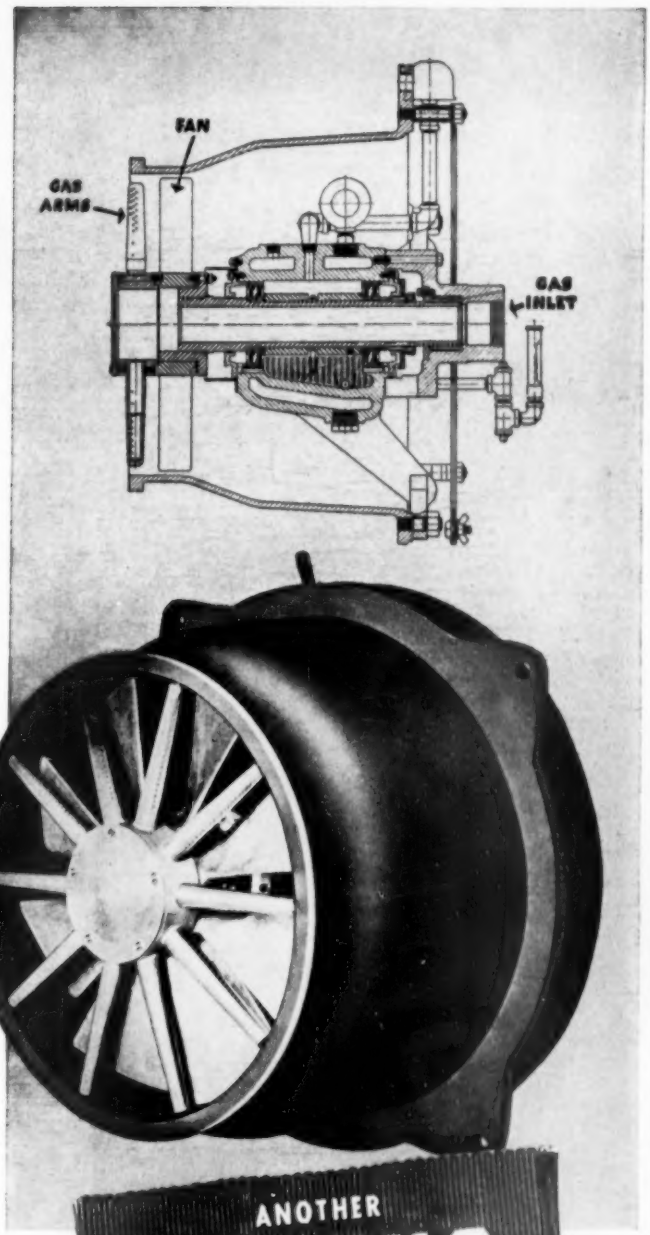
Because **FANMIX** delivers the *right* mixture of fuel and air *without blow-torch action*, all of your furnace space is used for combustion . . . *none for mixing*. That's why your present furnace can release more heat . . . why new installations can get more heat out of smaller furnace space.

Because **FANMIX** can be guaranteed to secure complete combustion of natural gas *with less than 5% excess air*, you get uniform "radiant heat" *without drifting hot spots*. That's why a **FANMIX**-fired furnace seldom varies in temperature more than 5% over its entire area.

WRITE FOR ALL THE FACTS

When you see in Bulletin 410–6 how fuel escaping from orifices in rotating driver arms rotates the fan to draw the correct proportion of air into the path of the fuel at right angles . . . how **FANMIX** creates its own forced draft, reduces stack requirements, prevents cracking of "wet" gas . . . how two **FANMIX** types handle either gas or oil or any combination of both — you'll understand why **FANMIX** Burners have such wide acceptance in oil refineries and power plants.

Send for the Coppus-Dennis **FANMIX** Bulletin 410–6. Coppus Engineering Corporation, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, and REFINERY CATALOG.



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262 Park Ave., Worcester 2, Mass.

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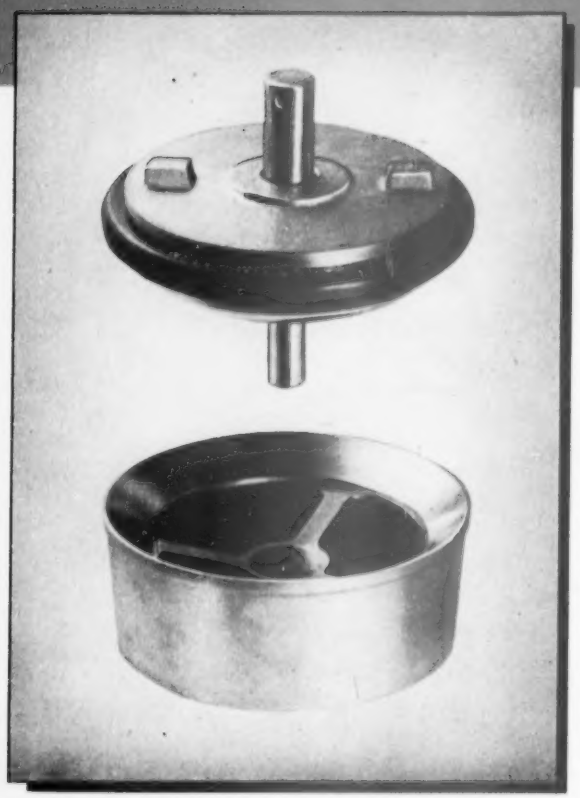
Maximum Areas for Free Passage of Fluids!

Maximum Metal-to-Metal Contact Areas!

...you get *BOTH* in these *NEW* Valves and Seats



...Designed Exclusively for "Oilwell" and Wilson-Snyder Slush Pumps

THESE NEW "Oilwell" fluid valves and seats are the result of intensive research . . . to design a valve that would permit free movement of drilling fluids through the passage areas, yet provide adequate metal-to-metal contact areas between the valve seat and the valve body to withstand wear from both abrasion and impact.

TRY A SET of these new valves and seats and find out for yourself how well they do their job when compared with other makes.

YOU'LL FIND

among other things . . .

(1) that the controlled-quality rubber inserts have outstanding wear-resistant characteristics;

(2) that replaceable upper and lower guide bushings practically eliminate valve-stem wear;

(3) that the combined design features of this valve make it highly adaptable to the pumping of "lost circulation" materials;

(4) and that the accurately-ground outside diameter of the valve seat minimizes the possibility of washouts in the fluid chambers.

ON SALE at your nearest "Oilwell" Store.

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TRADE MARK

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NO CRANE
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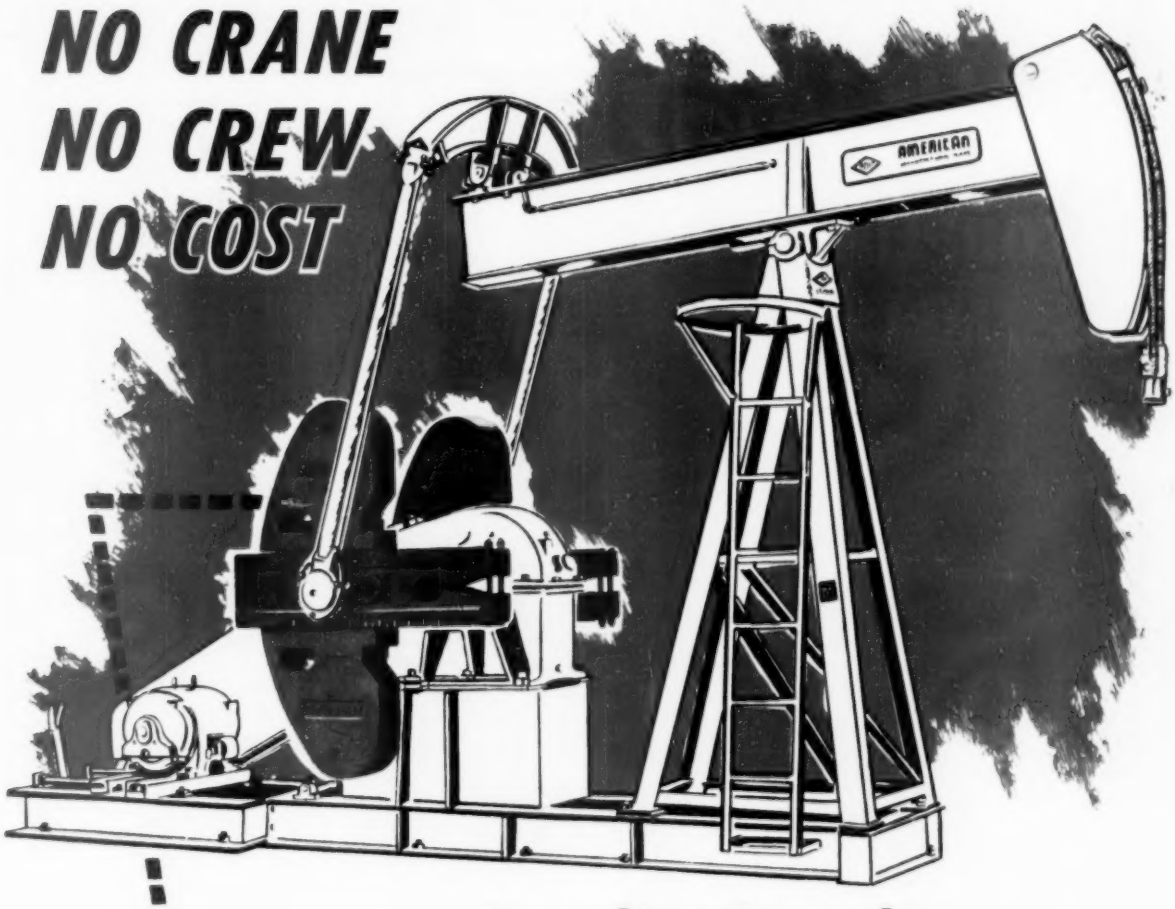
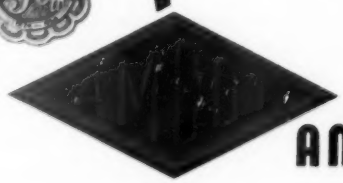
NO COST



...in adjusting the new
AMERICAN Counterbalance Crank

This new American Pumping Unit saves you operating time and money because it is a fast, easy one man job to adjust the unit counterbalance. Simply loosen two bolts that hold each master weight in position and turn the acme screw that moves the weight to the desired position. Yes, that's all there is to adjusting the unit counterbalance on the new American Pumping Units. Specify American and cut *Your* operating cost. Send today for free catalog or contact your nearest supply store or American Office.



AMERICAN MFG. CO. OF TEXAS

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Casper, Wyoming • Calgary, Alberta, Canada

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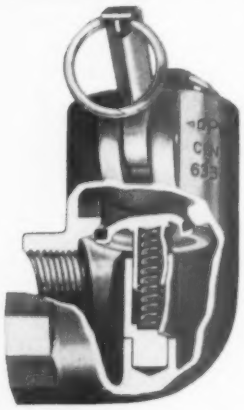
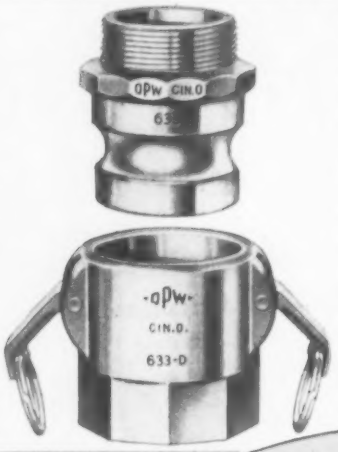
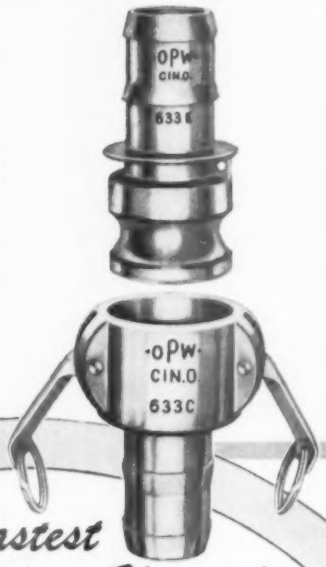
KAMLOK
COUPLING ASSEMBLIES







The Fastest Surest Coupling Known!

KAMLOKS positive seal all along the line assures *greater safety* in handling any type of liquid. A perfectly tight no leak connection is made in seconds by sliding coupler over adaptor, then pressing cam levers. No threads to engage, no twisting friction against gaskets, no tools required. KAMLOKS provide long years of economical trouble free service.

Available in any combination to meet coupling requirements in sizes from ¼" to 4" inclusive. Sizes ¼" to 3" precision machined of special hard wear resistant bronze. 4" size of hi-tensil OPALUMIN, (OPW hi-tensil aluminum alloy requiring no additional heat treating). 4" in bronze on special order.

Parts A, E, F, are interchangeable with parts B, C, D, G, H, in the same size.

OPW CORPORATION
2731 COLERAIN AVE. • CINCINNATI 25, OHIO

Free Bulletin F-10-O Highlights in Detail Kamlok's Quick, Tight Seal

117 MILES IN 100 WORKING DAYS WITH CAT* EQUIPMENT

EVER wonder why equipment like Caterpillar completely dominates a field like pipe-laying? No mystery at all. Listen to the experience of Oklahoma Contracting Company, while working on a line from Agua Dulce gas fields to Kosciusko, Miss.

"We laid 117 miles from October 15th through February 17th — 100 working days. At one stretch we laid 29 miles of 30" pipe in 20 days."

The power-packed D8 'dozing with a No. 8A Bulldozer in the picture has plenty of companion pieces in the spread. Altogether, Oklahoma Contracting has almost 150 Cat units.

That's how machine performance pays off. Pipeline men long ago discovered the advantages of standardizing on efficient yellow equipment.

For example, operators and mechanics really get to know the machines they work with. So operators get out all the work that's built in them. And mechanics service them faster and more efficiently — there's no time wasted puttering with strange machines and puzzling over unfamiliar service manuals.

What's more, you can carry a minimum of parts because many Cat parts are interchangeable. And when you do need service, you get it fast — no matter where you are — with a single call to your nearby Caterpillar Dealer.

Call him today. Just name the date and he'll be glad to demonstrate his equipment on your job!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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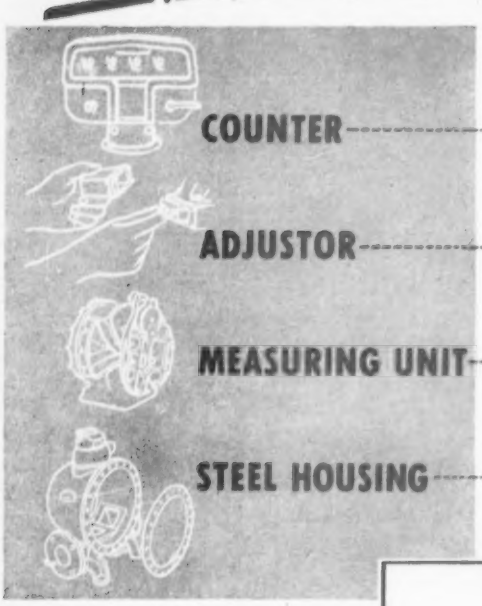
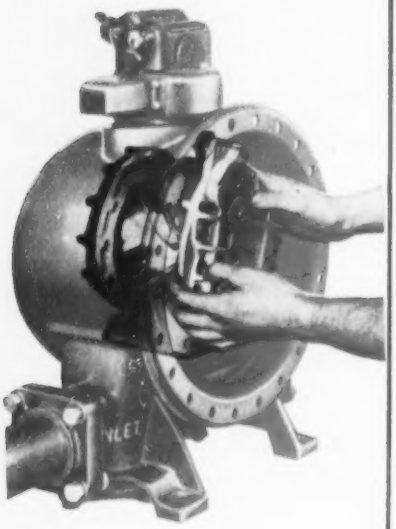
Completely INTERCHANGEABLE UNIT-BUILT ASSEMBLY OF BRODIE *BiRotor* METERS



IT'S WHAT'S INSIDE THAT REALLY COUNTS



HOLDS MAINTENANCE TO A MINIMUM

Quick, easy inspection and periodic cleaning—though seldom required—can be done without disturbing existing line connections—and without costly tie-up of facilities.

Each component assembly is fully self-contained, completely interchangeable and readily replaceable—adding unlimited service life to initial meter investment.

Readily available spare assemblies avoid the need for a stand-by meter—and eliminate costly time consuming maintenance and repairs.

From actual operating performance, Brodie BiRotor Meters deliver long continuous service with no measurable wear, no shutdowns or replacements. *Investigate fully today, write for full details.*

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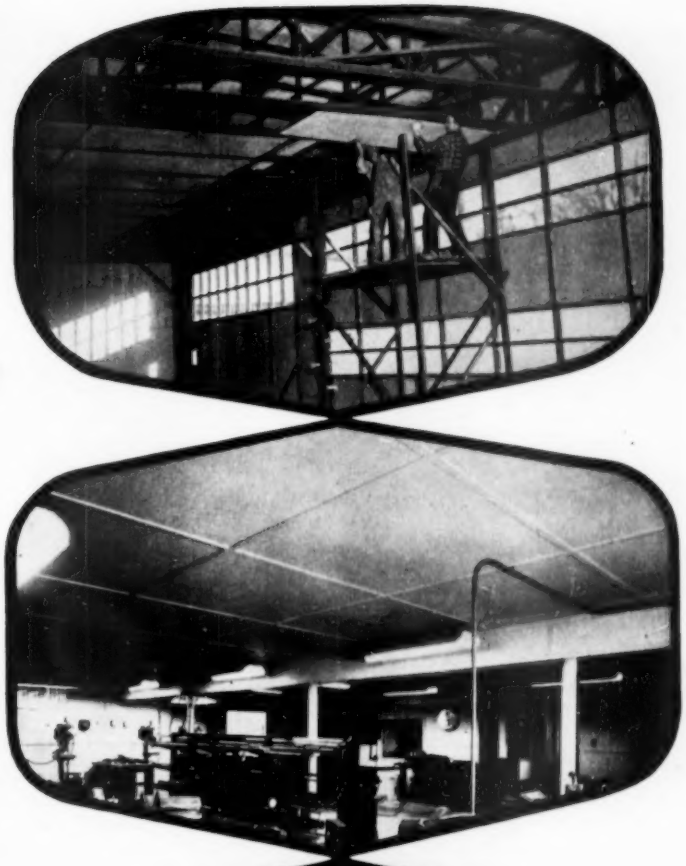
"Century" APAC

asbestos-cement sheets

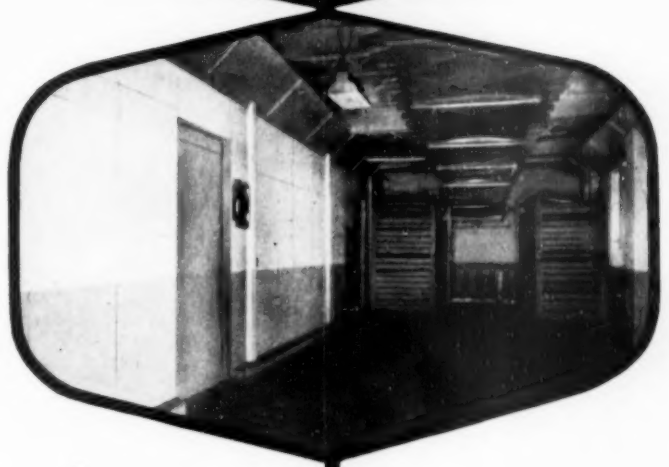


Here's the kind of building economy you can't afford to pass up! "Century" APAC sheets offer you the means to low-cost, trouble-free walls and ceilings on almost any type of building or structure.

These light, easily-handled sheets are made from portland cement and mineral asbestos. They will not burn, rot, or corrode, and they are impervious to insects and vermin. They take decorative colors well, although they never need paint for protection—indoors or out.

Rooms finished with "Century" APAC sheets are clean, attractive places in which to work. Structures sided with this versatile material have a trim, modern, efficient look. Best of all they *stay* that way, for "Century" APAC needs virtually no maintenance—ever!

Your K&M distributor can tell you more about this product and the other types of "Century" asbestos-cement sheets. See him soon! Or write directly to us.

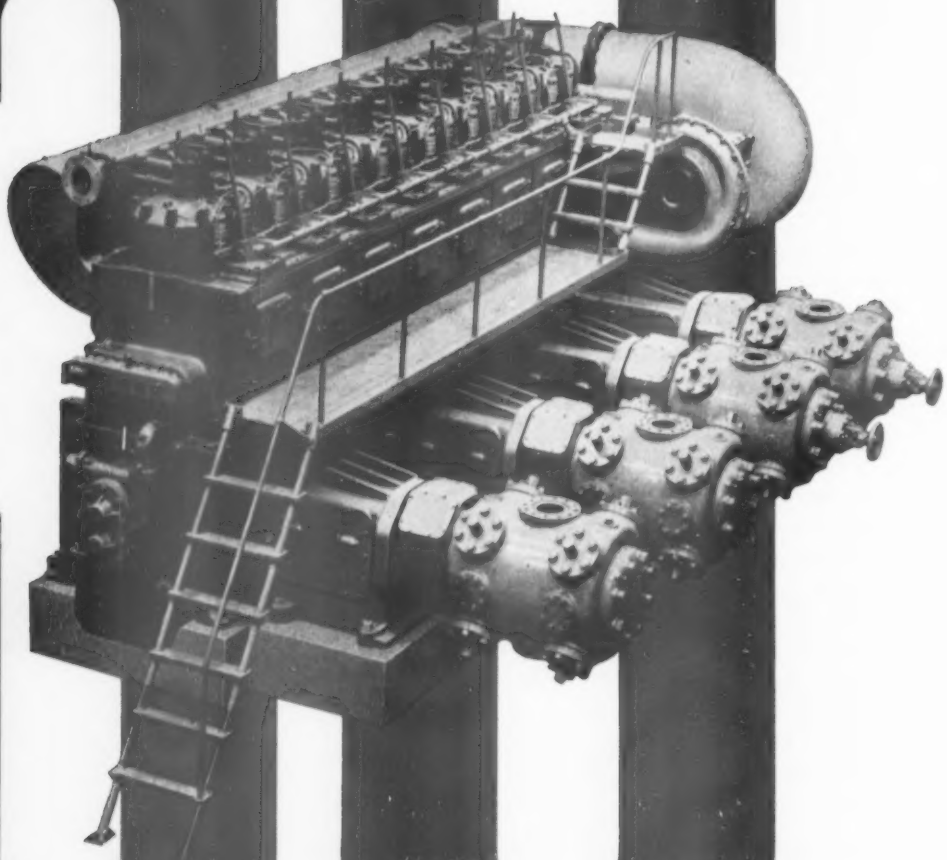


Nature made Asbestos . . .
Keasbey and Mattison has made it serve mankind since 1873

K&M Best in asbestos

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

50%



more power!

with Clark Model TRA Compressors

Delivering substantially more power than any compressors of comparable displacement, the *new* Clark 2-Cycle Turbocharged Gas-Engine-Driven Compressors are the most important development in the industry today.

Boasting a 50% power increase over non-turbocharged units of comparable size, the Model TRA delivers 825 to 1650 bhp per unit. This tremendous increase in output is accomplished with no sacrifice of overload capacity or in the ruggedness and durability characteristic of *all* Clark Compressors. *Actually, for their horsepower, Clark Turbocharged Compressors are the most rugged ever built.* The conservative BMEP rating of 92, together with the massive construction of the Model TRA, bear this out.

Where units of even greater output are required, Clark offers the world's most powerful gas-engine-driven compressor — the Turbocharged Model TLA — rated at 2000 to 3300 bhp per unit. Compared to non-turbocharged compressors of the same displacement, the TLA produces 36% more power at the conservative BMEP rating of 101.

While power output is vitally important in compressor design, economy of operation is even more important. Clark Turbocharged Compressors burn 12½% less fuel and require slightly over half of the cooling water used by non-turbocharged units. From these and other unique advantages, it is not hard to visualize the important savings in installation and operation of Clark Turbocharged Compressors.

For complete details, call your nearest Clark representative or write for Bulletin 130.

CLARK BROS. CO. • OLEAN, N. Y.

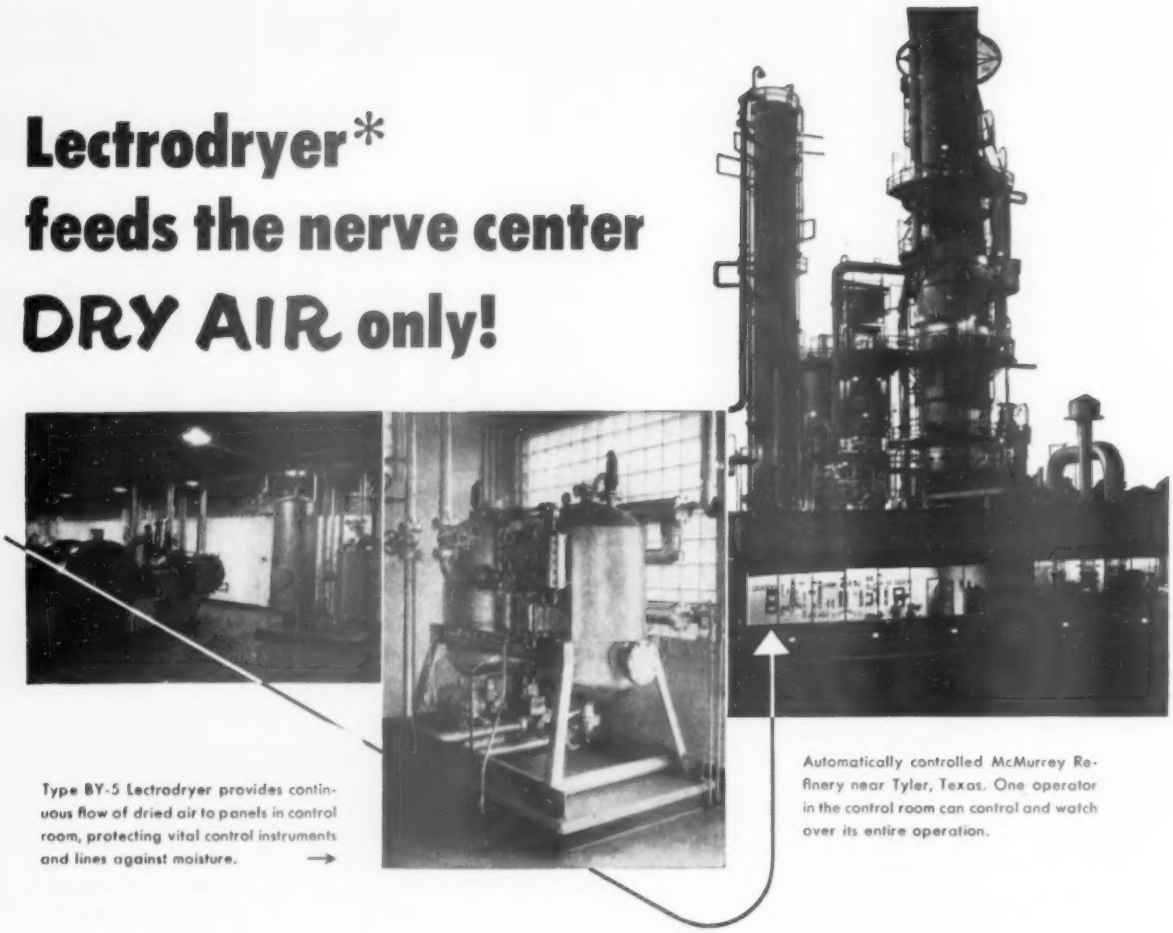
DIVISION OF DRESSER OPERATIONS, INC.

SALES OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

CLARK *Turbocharged Compressors*

Clark sets the pace in compressor progress

Lectrodryer* feeds the nerve center DRY AIR only!



Type BY-5 Lectrodryer provides continuous flow of dried air to panels in control room, protecting vital control instruments and lines against moisture. →

Automatically controlled McMurrey Refinery near Tyler, Texas. One operator in the control room can control and watch over its entire operation.

2300 instruments . . . 900 controllers and valves depend on DRY air to put this giant through its paces automatically. If unwanted moisture were to creep into instrument air at the nerve center, the refinery could be thrown haywire! An instrument line freeze-up, rust, scale or sludge clogging tiny ports could cause a long shutdown.

For 24 hours a day a Lectrodryer feeds the nerve center a constant stream of air dried to a dewpoint of −50° F. Moisture doesn't have a chance!

Lectrodryers catch the moisture which separators and filters let by. Throughout the chemical and petroleum industries they dry air, gases and organic liquids . . . automatically, economically, continuously. For extreme dryness there are Lectrodryers drying down to 3 to 4 parts per million or less.

Whatever the drying need, there's probably a Lectrodryer already built to handle it. Our engineers will help you lay out your system and select proper equipment. Write: Pittsburgh Lectrodryer Corporation, 325 32nd Street, Pittsburgh 30, Pa.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Bressoux-Liege.

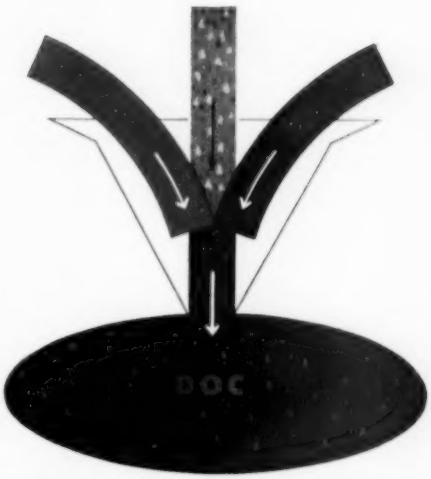
LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

*REGISTERED TRADEMARK U. S. PAT. OFF.

NEW CEMENT-OIL-SURFACTANT

improves squeeze cementing!



HALLIBURTON'S DOC

(DIESEL-OIL-CEMENT)

OFFERS MORE EFFICIENT CONTROL OF UNWANTED WATER . . .

Water-cement slurries proved valuable in squeezing to shut off bottom water. But improvement was needed. Oil-cement slurries revealed definite advantages over conventional mixtures. Now, adding a surfactant developed by Halliburton chemists gives increased dispersion and suspending properties to the diesel oil-cement slurry . . . makes it most effective in controlling unwanted water.

Halliburton's new DOC provides several advantages over ordinary slurries used in squeeze cementing:

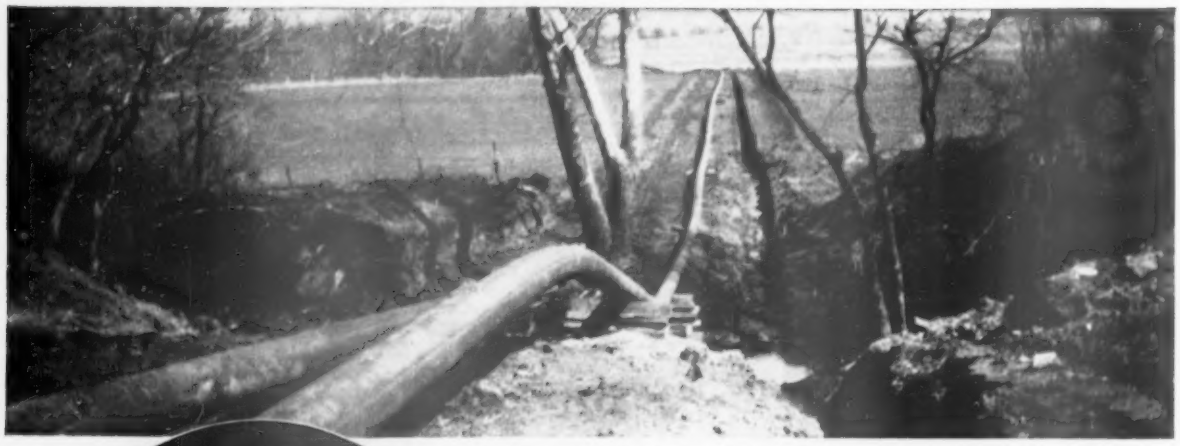
- **It possesses high density. Pumpable slurry weights up to 16.2 lb. per gal. have been obtained. When this ratio of solids to fluids is penetrated by formation water, the resulting set material reveals high compressive strength and low permeability.**
- **It has unlimited thickening time. It cannot set until penetrated by water, allows use of portland cement in deep hole squeezing. The slurry can be handled readily, and the excess easily reversed out of tubing.**
- **Squeeze techniques are similar to those now used, but there are variations. For one, this unique slurry sometimes requires lower pressures, and in some cases, a smaller volume of cement. Waiting-on-cement time is governed by the setting time of portland cement and varies from 24 to 72 hours.**

Results in widely-scattered areas indicate Halliburton's new DOC offers a valuable and most efficient method of controlling unwanted water. Take advantage of DOC on your next squeeze job. Phone your local or district Halliburton office. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

CEMENTING SERVICES

THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING!



● *Five miles west of Cushing, Okla., 10¾" Republic Electric Weld Line Pipe being laid.*

3 KINDS OF LINE PIPE ALL FROM REPUBLIC

● *This 24" O.D. Electric Fusion Weld Line Pipe is going in as part of a high pressure natural gas pipe line near Leeds, Alabama.*

Need Big Sizes? Republic makes Expanded Electric Fusion Weld Line Pipe in sizes 24" to 30" O.D. And it goes in *fast*. Circumference is always constant. Field joints line up accurately and quickly. The entire circumference can be welded at top speed. And to further speed field welding, uniform wall thickness provides an even distribution of metal all around the pipe.

From 2⅜" to 16" O.D. you can use Republic Electric Resistance Weld Line Pipe. Its high ductility assures smooth, uniform bends in the field or in the shop . . . without severe wrinkling. Uniform high yield strength permits building high pressure lines. Uniform wall thickness means dependability in every inch of the line.

Continuous Butt Weld Pipe made by Republic has been a standard in the oil fields for many years. It comes in nominal sizes ⅛" to 4" GRL, is used for gathering lines and many other oil and gas handling needs. It has uniform strength and ductility, tight adherence of the galvanized coating, is easily threaded, readily welded and bent.

When you need line pipe for oil and gas transmission, high or low pressure, remember, you can get all three kinds from Republic. Write for literature.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department:
Chrysler Building, New York 17, N.Y.

REPUBLIC STEEL

Republic LINE PIPE

ELECTRIC RESISTANCE WELD • ELECTRIC FUSION WELD
CONTINUOUS BUTT WELD

8 BOURDON TUBE MATERIALS

MAKE IT EASY TO SELECT THE RIGHT ASHCROFT DURAGAUGE FOR YOUR PARTICULAR NEEDS

- Phosphor Bronze
- S. A. E. 4130X Alloy Steel
- S. A. E. 4650 Alloy Steel
- "K" Monel
- Type 316 Stainless Steel
- Type 347 Stainless Steel
- Type 431 Stainless Steel
- Beryllium Copper

Service conditions and requirements determine what Bourdon Tube material is best in the pressure gauges you buy. To insure sustained accuracy and maximum durability in specific installations, Ashcroft Duragauges are available with Bourdon Tubes *in any one of the 8 listed materials.*

All Bourdon Tubes used in Ashcroft Duragauges are extra-wide–have greater sensitivity to slight pressure change. Pulsating pressures 50% higher than the tube rating remove any possibility of tube "set," and all tube joints are stress relieved after assembly. You can select with complete confidence that your Duragauges will serve accurately under the working pressures and corrosive conditions common to your operations.

Ashcroft Duragauges have other features important to you. The Nylon Movement* outwears all others. Unusually long tip travel assures greater accuracy of indication. The micrometer adjustment pointer can be reset while on the shaft. Precise recalibration of gauges in the field is easy. Sturdy lifetime cases, in a choice of materials, are available for stem, wall or flush mounting.

ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR to help you choose the right Duragauges for your particular service.

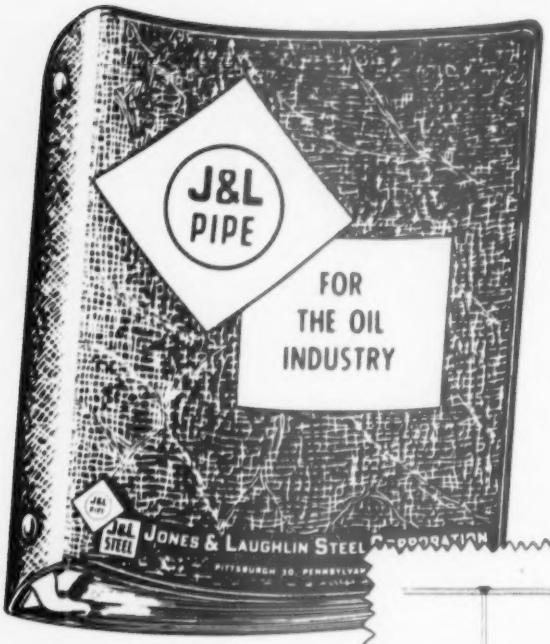
* Patented

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

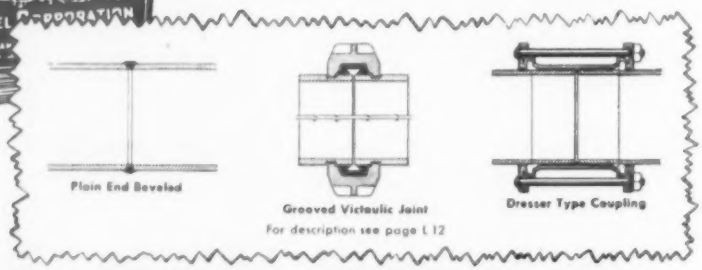
MAKERS OF 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

Get Your Copy!



In J&L pipe you get superior quality guaranteed by a hundred years of experience in making iron and steel, and rigid control of every process from mine to finished product.

Technical and other questions on the subject are all answered in a loose-leaf volume entitled J&L PIPE FOR THE OIL INDUSTRY. Ask for your copy.



WELL BALANCED STOCKS OF WELDED PIPE

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BUTTWELD – Standard, Extra Heavy & Line Pipe ⅛″ to 3″ Nominal Inclusive.

LAPWELD – Line Pipe 2″ to 4″ Nominal Inclusive.

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PARTNERS IN PETROLEUM PROGRESS

Let's talk SENSE about PLASTIC PIPE

• Let's face it! Plastic pipe is revolutionizing oil country piping. Of course plastic cannot be used on every installation . . . but even metallic piping is impractical for certain applications.

• CARLON Plastic Pipe is specifically developed for oil country piping and has been rigidly tested. Carlon engineers have determined exactly how CARLON Plastic Pipe will perform on specific installations.

• CARLON is definitely superior to metal pipe when used for lead, distribution, salt water disposal and gathering lines, as well as risers, gas vents and fresh water transmission.

• CARLON resists the effects of acids, crude oil, sour crude and sulphurous waters. The smooth interior walls in most instances prevent accumulation of paraffin, scale and sediment and remain clean throughout the installation period.

• CARLON is not a universal oil piping material . . . it has limitations. But if utilized within the established limits of pressure and temperature, CARLON Plastic Pipe provides years of trouble-free service. Use it right and you can't go wrong . . . that's why CARLON is unconditionally guaranteed to meet the highest standards of quality and performance.

Send today for complete information on CARLON Plastic Pipe for oil country piping.

CARLON

THE PIPE WITH THE STRIPE

CARLON PRODUCTS CORPORATION

Pioneers in Plastic Pipe

10201 MEECH AVENUE • CLEVELAND 5, OHIO

THE FIRST REAL PIPE THAT IS PLASTIC • BUY THE PIPE WITH THE STRIPE!

1718-CP

CARLON PLASTIC PIPE IS PRODUCED IN TEXAS, COLORADO, OHIO, OREGON, NORTH CAROLINA AND ONTARIO

1

cut

2

cement

3

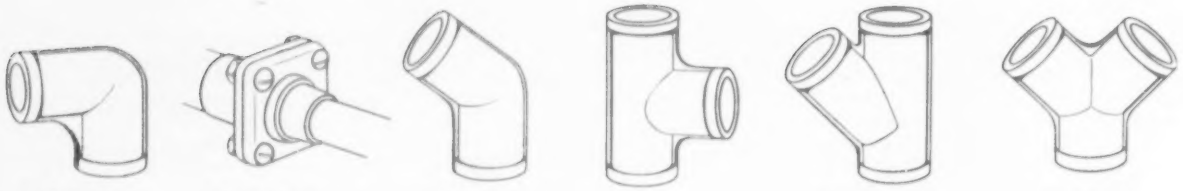
assemble

Join corrosion-resistant Tenite plastic pipe in 3 simple steps

Whether you are making up ½" or 4" pipe, Tenite Butyrate fittings save time, effort, and money. To install them you need only a saw, a paintbrush, and solvent cement. Simply cut the pipe, apply solvent with paintbrush, slip on the fitting – the joint is done . . . This fast procedure eliminates thread-cutting and the necessity for lugging clumsy, heavy tools around the job. Alignment is neater, easier to achieve. Moreover, the finished joint has the same toughness and exceptional corrosion resistance as the Tenite pipe itself.

A wide range of Tenite plastic fittings is now available from various manufacturers. Use the coupon below or write for a list of sources and further information about the advantages of using Tenite Butyrate pipe and fittings.

EASTMAN CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE
Subsidiary of Eastman Kodak Company



90° ELBOW | FLANGE UNION | 45° ELBOW | TEE | 45° LATERAL | TRUE "Y"

EASTMAN CHEMICAL PRODUCTS, INC.
Kingsport, Tennessee
Please send me a list of sources of Tenite Butyrate fittings and pipe.
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POSITION.....
COMPANY.....
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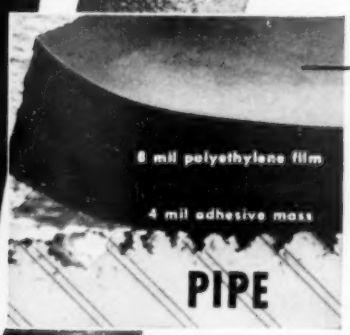
TENITE
BUTYRATE
an Eastman plastic

NOW..POLYETHYLENE PROTECTION YOU WRAP ON!

Polyken Protective Tape Coatings Control Corrosion more efficiently and with less work!



GREATER EFFICIENCY

Here's why *Polyken* Protective Tape Coatings provide more efficient protection:

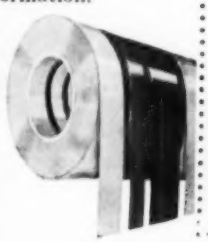
- *Pre-formed* plastic film coating . . . manufactured by a controlled process from reproducible raw materials to assure uniform coatings every time.
- *Polyethylene* coating consisting of an 8 mil tough, oriented, elastic film . . . recognized for its excellent resistance against corrosive attack, its resistance to moisture, and its high dielectric strength.
- *Bonded* securely by a 4 mil stable adhesive, a durable protective barrier in itself.

LESS WORK

Apply this *Polyken* Protective Tape Coating *right off the roll.* Requires no heat, liquids, solvents or thinners. Eliminates drying time, clean-up time and shut-down time. Even inexperienced workmen can apply it at 20 to 30 feet per minute by machine. Goes on tightly and evenly.

Polyken Protective Tape Coatings are available in two colors: black, No. 900; and gray, No. 910. Use the coupon for test samples and further information.

Polyken®
PROTECTIVE COATINGS
POLYKEN PRODUCTS DEPARTMENT OF THE KENDALL COMPANY



Polyken, Dept. OGB
222 West Adams St., Chicago 6, Illinois

Please send me samples and further information on *POLYKEN* PROTECTIVE TAPE COATINGS.

Name_____ Title_____

Company_____

Street Address_____

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You can make high quality welds, quickly and easily, in stainless, aluminum, cast iron, HASTELLOY and MULTIMET alloys—practically all commercial metals—at lower cost with the 300 amp. HELIARC HW-10 water-cooled torch.

You'll find that the improved water-cooling system assures cooler and more effective operation even when the torch is used continuously at the full rated capacity. The cooling water flows through the power cable and torch body down to the water jacket and gas cup. The return flow follows the same route in reverse. All exterior "plumbing" has been eliminated allowing more maneuverability and preventing leakage due to accidental damage. Water-cooling makes lightweight torch construction possible, and because the power cable is also water-cooled, it too, is lightweight and easy to handle.

The HW-10 was designed so that the water passages are accessible and easily cleaned.

Electrodes are easily adjusted on the HW-10. A quarter turn of the torch cap releases the electrode for adjustment or replacement. You need no wrenches or other tools. In addition, electrode stub loss is reduced by placing the water-cooled electrode holder much closer to the arc.

Are you getting the best possible results from your present welding apparatus? Developments in the inert gas welding field have been so great and have come so rapidly that torches over four or five years old are now obsolete. Be sure that you have the highest production at the lowest cost. Modernize with the 300 amp. HELIARC welding torch.

Your local LINDE representative would be happy to give you more detailed information on the HELIARC HW-10.

"Heliarc," "Hastelloy," "Linde," and "Multimet" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde
TRADE-MARK

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
General Office: UCC New York 17, N.Y.
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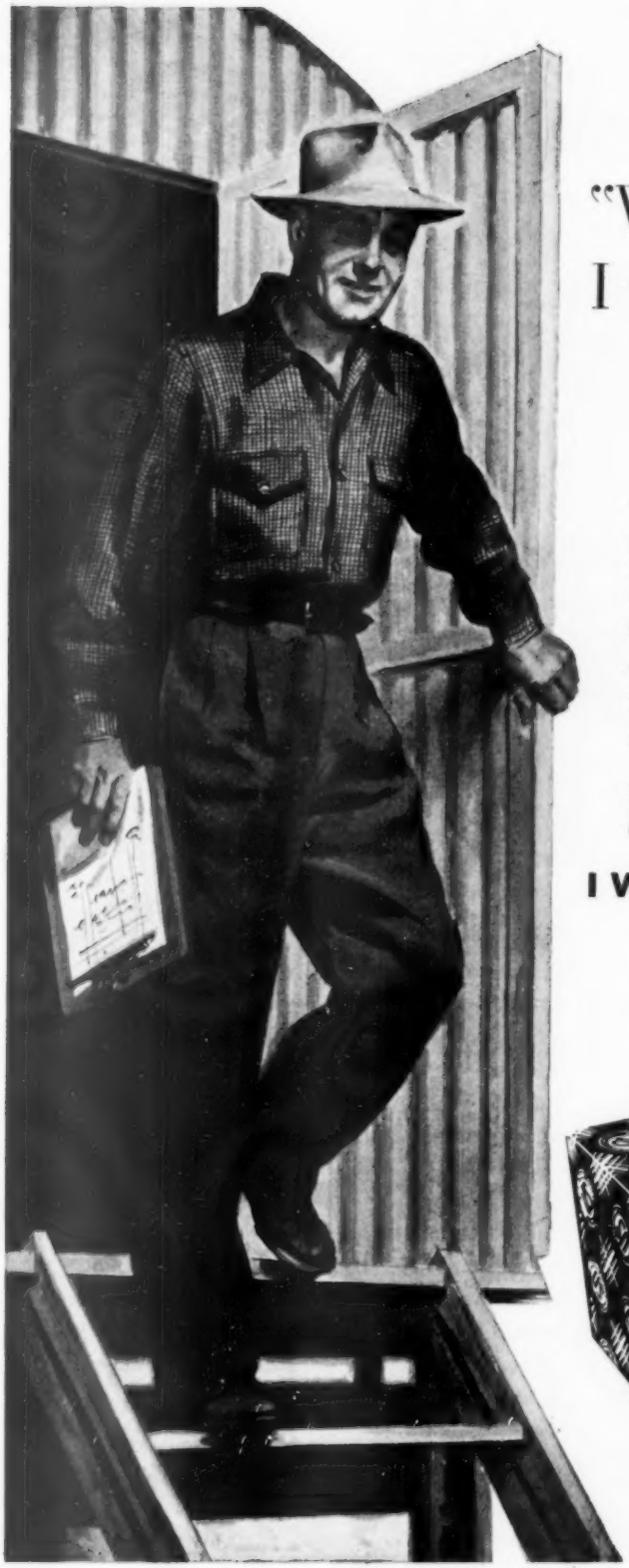

"When I want packing, I want it right... and in a hurry!"

says "Red" Royal

"That's why I always order U. S. Rubber's *Labeled* Line of Packings. I don't have to worry about shaft diameters and stuffing box depths. All I do is give the name and size of the pump and I get the *right* packing —with no guesswork, no loss of time."

To get the right packing for your drilling needs, just say:

I WANT	FOR (name the pump and size)	THEN... (when re-ordering simply ask for U. S. Packing—)

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PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

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The answer to high pressure gas scrubbing

The Problem

Cleaning waste liquids and solids from gas for pressurized reinjection into wells.

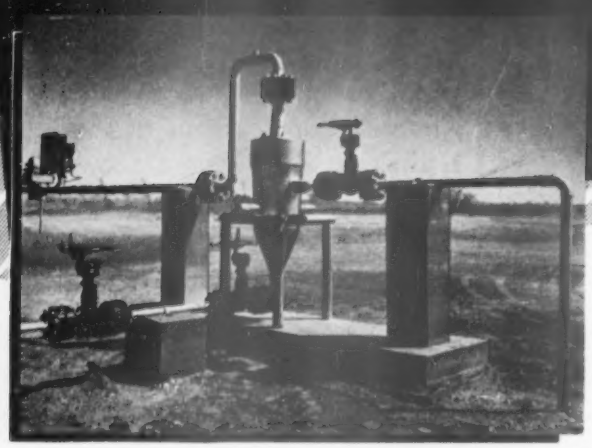
The Equipment

AEROTEC

DRY GAS SCRUBBERS

The Results

1600 gallons of waste products extracted daily from 9 million cubic feet of reinjection gas.



Installations of Aerotec Gas Scrubber at University, Block 31, Field, Crane County, Texas.

Cutaway section of Aerotec Gas Scrubber designed for high pressure applications.

New Proof of the practical, profitable advantages of Aerotec Dry Gas Scrubbers comes from the oil-producing industry. This backs up the long experience of natural gas companies with hundreds of units in daily use. These Aerotec Scrubbers, at wells and in pipelines, are cleaning foreign liquids and solids from natural gas with exceptionally high efficiency.

This Aerotec high pressure application is successfully employed by the Atlantic Refining Company in a jointly-owned claim in the University, Block 31, Field located in Crane County, Texas. The Aerotec Gas Scrubber removes components of lubricating oil from gas going to injection wells at 4,000 psi. It has also removed sand, mill scale and iron sulfides, and because no fluids are used in the separation process, no residue is carried over to the gas.

Additional units are now being installed before new injection wells are put into operation.

Lightweight and compact, Aerotec Gas Scrubbers are easy to install. Available in standard units up to 100,000,000 SCFD, they can be manifolded to meet larger requirements. For experienced engineering assistance in matching Aerotec Scrubbers to *your* specific need, or for catalog data on these units, call or write The Thermix Corporation.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.

(Offices in 38 Principal Cities)

Canadian Affiliates: T. C. CHOWN, Ltd., Montreal 25, Quebec; Toronto 5, Ontario

Manufacturers

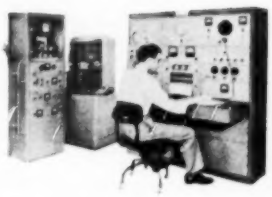
THE AEROTEC CORPORATION

GREENWICH, CONN.

danger...smog

How Consolidated instrumentation is helping to win the battle against air pollution

Consolidated Titrilogs, both stationary and portable models, serve in the nation's growing battle against air pollution. Titrilogs are used for pin-pointing sources of toxic air contamination and for continuous, automatic recording of varying concentrations of sulfur compounds. Audible warning against dangerous sulfur compounds in traces as low as 0.1 part per million is a feature of these sensitive instruments that are safeguarding growing numbers of industries and communities. Request Titrilog Bulletin CEC-1810B-X3.



Consolidated Analytical Mass Spectrometers also play an important part in the scientific attack on air pollution by positive identification and measurement of pollutants in air samples. This type of smog analysis is being carried out by many research foundations and industrial laboratories in an effort to track down sources and explain the formation of smog. Write for Analytical Mass Spectrometer Bulletin CEC-1800B-X18.

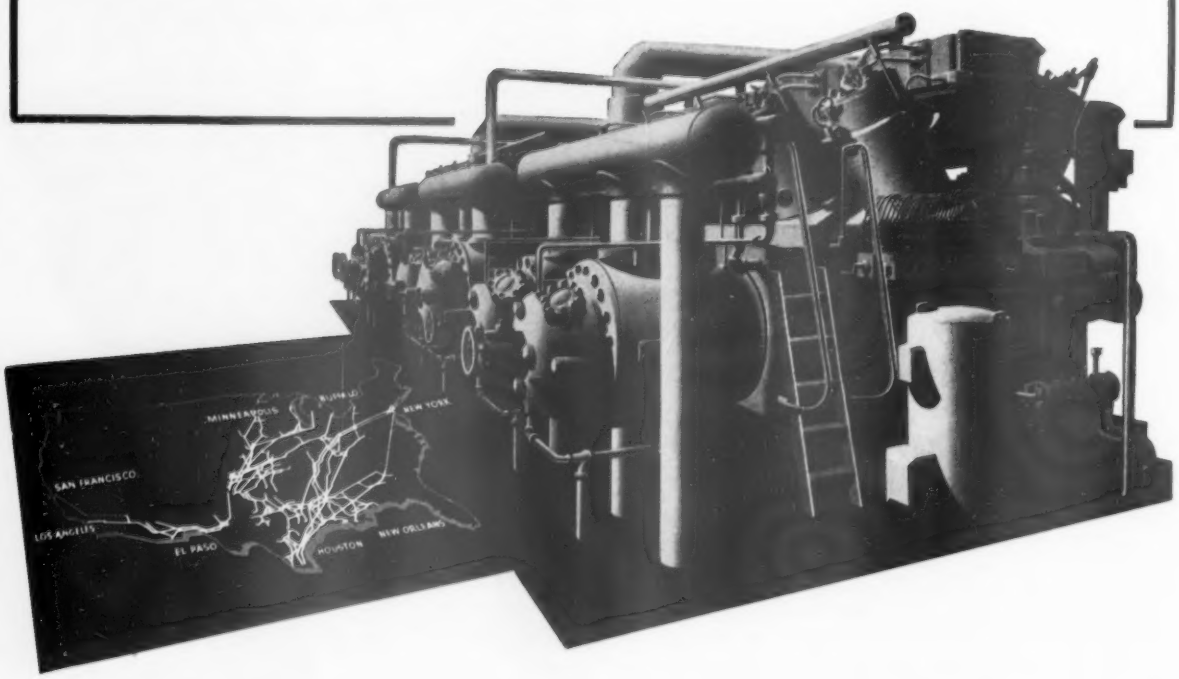
Consolidated Engineering
CORPORATION
300 North Sierra Madre Villa, Pasadena 15, California

Sales and Service through **CEC INSTRUMENTS, INC.,** *a subsidiary with offices in: Pasadena, Chicago, Dallas, Detroit, New York, Philadelphia, Washington, D. C.*

ANALYTICAL INSTRUMENTS FOR SCIENCE AND INDUSTRY

GULF SECURITY OIL

provides better lubrication
for pipe line compressor units,
helps prevent operating troubles



Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Sales Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

Gulf Oil Corporation · Gulf Refining Company,
Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

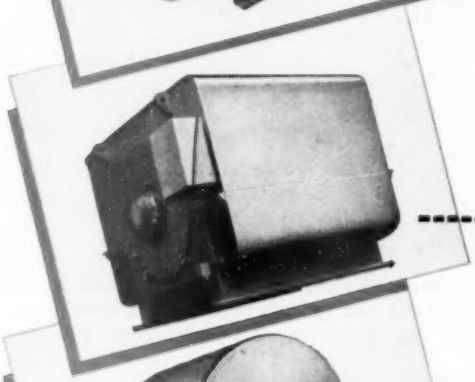
Get the Motor You Need

ALLIS-CHALMERS
Large Induction MOTORS

Because Allis-Chalmers builds a complete line of induction motors for the petroleum industry, you can select the exact degree of protection needed

Drip-Proof or Splash-Proof

In many cases, drip-proof or splash-proof motors can readily be used for refinery power-plant auxiliaries, crude oil pumping, and similar applications. Designs based on half a century of motor building experience assure dependability and durability. For detailed information, ask for Bulletins 05B7542 and 51B7693; for two-pole motors 900 hp and larger, get Bulletin 05B7550.



Weather-Protected

Wherever open ventilation is permissible, weather-protected motors can be used. And they can be used outdoors in any kind of weather — rain, snow, sleet, or blowing dust and sand. Special tests with sand and water driven at 75 mph proved that these motors need no housing. Yet they cost little more than indoor splash-proof machines. Ask for Bulletin 05R7874.

Enclosed Forced-Ventilated

Here's a design developed especially for pipeline-station pump and compressor drives. Protection for these hazardous locations is provided by supplying the ventilating air under pressure. The motors cost little more than open designs, and enclosed design minimizes maintenance. Construction of basic motor components is the same as in standard open machines.

Totally-Enclosed Fan-Cooled

For maximum motor protection, specify Allis-Chalmers *tube-type* TEFC or explosion-proof motors. They offer complete enclosure of electrical parts, self-cleaning action and full internal air circulation. Time-proved design permits ratings up to 3000 hp and larger. Underwriters' labels up to 800 hp at 3600 rpm. Ratings and construction details are given in Bulletins 51B7149 and 05B7150.

For more information or for engineering assistance, call in your nearby A-C representative. Or write for the descriptive bulletins listed above. Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4063

You'll Save Thousands of Dollars...

with

PARKERSBURG

Air Balanced

PUMPERS

EASIER BALANCING

Changing the counterbalance is as simple and easy as turning a valve. The counterbalance adjusts itself automatically to any setting. The new Parkersburg Time Compensator automatically keeps the counterbalance adjusted.

AIR PUMPING SYSTEM

The Parkersburg system is much simpler, more efficient and safer than compressors. There is no pressure against beam or brake while unit is down—full pressure always ready to put unit into operation.

QUALITY CONSTRUCTION

They are built to meet the standard of quality and over the years this pays dividends that more than offset their slightly higher first cost.

LOWER MAINTENANCE COSTS

One operator who tested them against conventional type pumpers and gas lifts saved up to $5000 per year on a single well on maintenance costs alone.

LESS INSTALLATION COSTS

You do not need the heavy, expensive concrete foundations required for standard pumpers. Air Balanced Pumpers require only about 60% of the amount of foundation called for in standard pumper installations.

LESS ROD REPLACEMENT

Parkersburg Air Balanced Pumpers develop lower polish rod loads than standard pumpers employing crank and beam weight counterbalance. This will save you thousands of dollars in downtime, lost production and rod replacements.

No. 5321

PARKERSBURG

PUMPERS *Air Balanced • Chain Driven • Gear Driven*

Manufactured in Coffeyville, Kansas

They Say—

Immediate Outlook Very Good

"The outlook is very good. It's not as good in some ways as last year, perhaps, because the peak of the boom is past, but still very good. A sort of a mild contraction is apparent all over the country. This means that while business will be good, it will not be good for everybody. It will be good for those who can adjust themselves to more normal competitive times. It will not be so good for those who have been drifting with the current and have forgotten how to row upstream.

" . . . this isn't a recession. It's not that serious. It's simply an adjustment from an abnormally high level which no thinking person expected to go on forever to a more normal level which will still be very high but will have more chance of lasting."

Marion E. Dice, manager, economics department, General Petroleum Corp., Los Angeles, in a radio interview on "How's It Look for '54 . . . ?"

Three Point Appraisal

"To appraise any company fairly, you have to examine it from the respective viewpoint of the customer, the employe, and the stockholder. Unless all three of these separate groups get 'square deals,' the future for even the most prosperous firm can't be very hopeful."

Editorial in Esso Refiner.

Would Discourage Development

"The absorption of domestic markets by steadily mounting import of foreign oil has had an adverse effect upon all domestic oil producers during the past year and undoubtedly will have an even greater effect during the year ahead. If continued at present rates, it will force 'cutbacks' in domestic production which will seriously discourage new development.

"Ultimately, and in the not too distant future, this will bring about a reliance upon oil import which will gravely impair the ability of the domestic industry to meet requirements should this nation again be forced into a national emergency.

"Thus, the threat is not merely one to oil industry economics: it is a real threat to national security. The final decision as to whether quotas will be imposed to govern oil imports rests with public awareness of this vital situation and in turn the communication of opinion to congressmen. All of us should make a concerted effort to arouse interest in this matter in order to bring about constructive governmental action."

Statement of Curtis F. Bryan, president, Toklan Royalty Corp., Tulsa, Okla.

Marketing Spending Increasing

"We have been spending an increasing amount of money trying to learn how to do a better job of oil marketing in both direct and indirect sales. These expenditures will be greater in 1954 than they were in 1953. We are doing this because we believe with each passing year there will be less and less room for guesswork in the distribution and sale of oil products.

"Whatever we may learn about how to do a better job of oil marketing, we want to share with our jobbers. At a time when competition is getting keener, we believe it is essential that we do so, in fairness to those who have linked their names with ours, and as a matter of good business for a com-

Do your present safety tools give you these four advantages?

SAFE—Berylco Safety Tools aren't half safe—they're absolutely safe, because they're made of beryllium copper and are non-sparking in the presence of explosive or inflammable liquids, gases and dusts. Nonmagnetic and noncorrosive, they are also ideal for chemical or marine use.

TOUGH—Beryllium copper is a high-performance material so rugged that it is used for bearings in hard-working machine tools. Berylco Safety Tools have the strength of mild steel. They resist heavy impact, retain their cutting edges for a long time, outlast cheap tools by far.

HANDY—Because of the great strength of beryllium copper, Berylco Safety Tools are better designed—and thus easier to use—than safety tools made of less sturdy materials. Ordinary safety tools are given strength through size; workmen like to use easy-to-handle Berylco tools.

LOW COST—Berylco Safety Tools are competitive with steel tools of equal quality, yet the pennies you spend on *them* may save you dollars in plant damage or lost production time. Remember, too, initial cost doesn't include replacement cost; you replace Berylco tools less often than cheap tools.

BERYLCO

Here's another important advantage of Berylco Safety Tools. They're sold by regional warehouse distributors the country over. For the name of the one nearest you—and for a complete, illustrated catalog of over 400 tools—write THE BERYLLIUM CORPORATION, Dept. 4B, Reading 15, Pa.

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Replace the magnetos on your pumping engines with Fairbanks-Morse Super Spark Magnetos. They are the ultimate in dependable trouble-free engine ignition—a constant powerful spark assures efficient steady performance day in and day out under the most rugged conditions.

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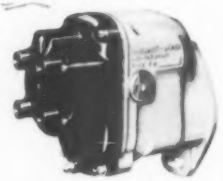
Change now to Super Spark Magnetos. See your Fairbanks-Morse Service Station or distributor or write Fairbanks, Morse & Co., Magneto Division, Beloit, Wis.



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pany that depends on jobbers for 40 per cent of its sales. The extent to which this can be done depends in part on our knowing what problems our jobbers have, and their knowing what we have to offer."

Paul V. Keyser, Jr., domestic marketing manager, Socony-Vacuum Oil Co., Inc., New York, speaking before the Northwest Petroleum Association at St. Paul, Minn.

Scapegoats For Murder

"Scapegoats for murder are many. We blame speed. We blame drinking drivers. We blame highways. In fact, we blame everything and everyone but ourselves, the drivers. To find the real cause of licensed suicide, it is necessary to make what seem to be rather obvious statements:

"A car does not go out of control until a driver loses control over the vehicle.

"An accelerator does not go to the floorboards unless it is pushed there by the driver.

"Speed, alone, does not kill until a driver allows it to become greater than his ability to control.

"A car never is mechanically defective unless the owner has allowed it to become so.

"A highway, or bad weather, do not cause collisions.

"These are the scapegoats for the thoughtlessness, the inattention, the discourtesy, the overinflated egotism, and the impatience of human beings. These are the excuses of people who overdrive their ability, who drive faster than common sense dictates, who drink when they know they cannot drink and drive sensibly, who pass on hills or curves, and who always assume, 'It can't happen to me.'"

Oregon Traffic Safety Division.

CALENDAR OF EVENTS

FEBRUARY

- **4** Instrument Society of America, ninth annual regional conference, Hotel Statler, New York City.
- **8-9** Two-day conference on marine corrosion problems, University of California, Berkeley.
- **11-12** Western Petroleum Refiners Association, regional meeting, Hotel Beaumont, Beaumont, Tex.
- **14-18** American Institute of Mechanical and Metallurgical Engineers, Hotel Statler, New York.
- **15** American Society for Testing Ma-

40-ton workhorse

TYPE D218
DOUBLE SHEAVE
WEIGHT 760 LBS.

TYPE D118
SINGLE SHEAVE
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GUIBERSON Type D Tubing Block with Swivel Becket

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The top-opening becket link is permanently pinned at bottom. Becket opening is 6½″ x 9½″ and will accommodate up through 2¾″ links. Sheaves are grooved for ⅞″ or ¾″ wire line.

Priced right and built right, the Guiberson Type D block and swivel becket is rated at 40 tons, with a factor of safety 3 to 1 on yield point. Well within API specifications. Maximum height with becket 55¼″, maximum width 20″. Thickness, double sheave 9⅝″, single sheave 7″.

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terials, southwest district (Dallas-Fort Worth), and National Association of Corrosion Engineers, joint meeting, Dallas.

17-19 Corrosion Control Short Course, fifth annual, Tulsa section of National Association of Corrosion Engineers, Mayo Hotel, Tulsa.

19-20 National Society of Professional Engineers, spring meeting, Hilton Hotel, Albuquerque, N. M.

22 American Association of Petroleum Geologists, Rocky Mountain section, annual meeting, Albuquerque, N. M.

26 Natural Gasoline Association of America, Permian Basin regional meeting, Lincoln Hotel, Odessa, Tex.

MARCH

1- 5 American Society for Testing Materials, spring meeting, Shoreham Hotel, Washington, D. C.

4- 5 American Petroleum Institute, Division of Production, Southwestern district, Rice Hotel, Houston.

4- 5 American Gas Association, transmission and storage conference, Jung Hotel, New Orleans.

8-10 American Institute of Chemical Engineers, Statler Hotel, Washington.

15-19 National Association of Corrosion Engineers, annual meeting, Municipal Auditorium, Kansas City, Mo.

17-19 American Petroleum Institute, Division of Production, Mid-Continent district, Biltmore Hotel, Oklahoma City.

23-April 1 American Chemical Society, annual meeting, Municipal Auditorium, Kansas City, Mo.

26 American Chemical Society and Sabine Area American Institute of Chemical Engineers, joint session, Beaumont, Tex.

29-31 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

APRIL

4- 6 Texas Independent Producers and Royalty Owners Association, Rice Hotel, Houston.

5- 7 American Society of Lubrication Engineers, Netherland-Plaza Hotel, Cincinnati.

6- 8 Petroleum Industry Electrical Association, annual convention and exhibit, Adolphus and Baker Hotels, Dallas.

8- 9 American Petroleum Institute, Division of Production, Rocky Mountain district meeting, Townsend Hotel, Casper, Wyo.

8- 9 Second annual instrumentation conference, Louisiana Polytechnic Institute, Ruston, La.

12-16 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, annual meeting, St. Louis.

13-15 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.

14-16 National Petroleum Association, fifty-first semiannual meeting, Cleveland Hotel, Cleveland.

21-23 Natural Gasoline Association of America, thirty-third annual convention, Baker Hotel, Dallas.

22 Illinois Oil and Gas Association, annual directors meeting, Hotel Emmerson, Mount Vernon, Ill.

26-28 Southern Gas Association, annual convention, Houston.

MAY

2- 4 Independent Petroleum Association of America, midyear meeting, Cosmopolitan Hotel, Denver.

3- 5 American Geophysical Union, thirty-

fifth annual meeting, National Academy of Sciences, Washington, D. C.

3- 5 Air Pollution Control Association, annual meeting, Patten Hotel, Chattanooga, Tenn.

6- 7 American Petroleum Institute, Division of Production, Pacific Coast district meeting, Statler Hotel, Los Angeles.

9-12 Liquefied Petroleum Gas Association, annual convention and trade show, Conrad Hilton Hotel, Chicago.

10-12 American Petroleum Institute, Division of Transportation, Products Pipe Line Conference, Warwick Hotel, Philadelphia.

10-13 American Petroleum Institute, Division of Refining, midyear meeting, Rice Hotel, Houston.

14-15 Interstate Oil Compact Commission, General Oglethorpe Hotel, Savannah, Ga.

16-19 American Institute of Chemical Engineers, Springfield, Mass.

17-19 American Petroleum Institute, Division of Marketing, midyear meeting, Cosmopolitan Hotel, Denver.

24-26 American Gas Association, production and chemical conference, William Penn Hotel, Pittsburgh.

27-28 Natural Gas and Petroleum Association of Canada, Prince Albert Hotel, Windsor, Ont., Canada.

31-June 5 American Petroleum Institute, Division of Production, midyear committee conference, St. Francis Hotel, San Francisco.

JUNE

3- 4 Pennsylvania Grade Crude Oil Association, thirty-first annual meeting, Hotel William Penn, Pittsburgh.

6-11 Society of Automotive Engineers, summer meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

13-18 American Society for Testing Materials, annual meeting and exhibit, Sherman and Morrison Hotels, Chicago.

17-19 American Petroleum Institute, Division of Production, eastern district meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

20-24 Canadian Gas Association, Banff Springs Hotel, Banff, Alta., Canada.

27 July 1 Petroleum Equipment Suppliers Association, nineteenth annual meeting, Manoir Richelieu, Murray Bay, Que., Canada.

AUGUST

17-19 Society of Automotive Engineers, Inc., international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.

SEPTEMBER

9-11 Interstate Oil Compact Commission, Omaha, Neb.

12-16 American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.

15-17 National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.

28-29 Texas Mid-Continent Oil and Gas Association, annual convention, Baker Hotel, Dallas.

OCTOBER

7- 8 California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.

11-13 American Gas Association, annual convention, Atlantic City, N. J.

11-13 American Association of Oilwell Drilling Contractors, annual meeting, Biltmore Hotel, Los Angeles.

14-17 Permian Basin Oil Show, Odessa, Tex.

Have you tried "that new snap-on PIPE INSULATION?"

"That new snap-on pipe insulation" that's causing so much comment in industry is G-B ULTRAFINE PIPE INSULATION. It's the first and ONLY one-piece molded pipe insulation of fine glass fibers — ideal for hot or cold piping, for plant maintenance or new construction.

To the many advantages you see illustrated below, you can add ECONOMY. G-B ULTRAFINE PIPE INSULATION costs no more than other insulations, and users report APPLICATION SAVINGS UP TO 50%!

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The combination to open up
BEST POSSIBLE PRODUCTION
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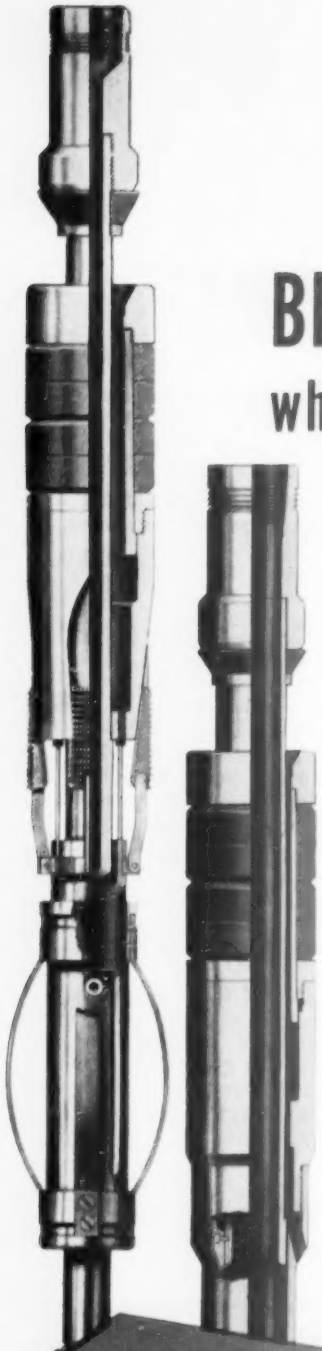

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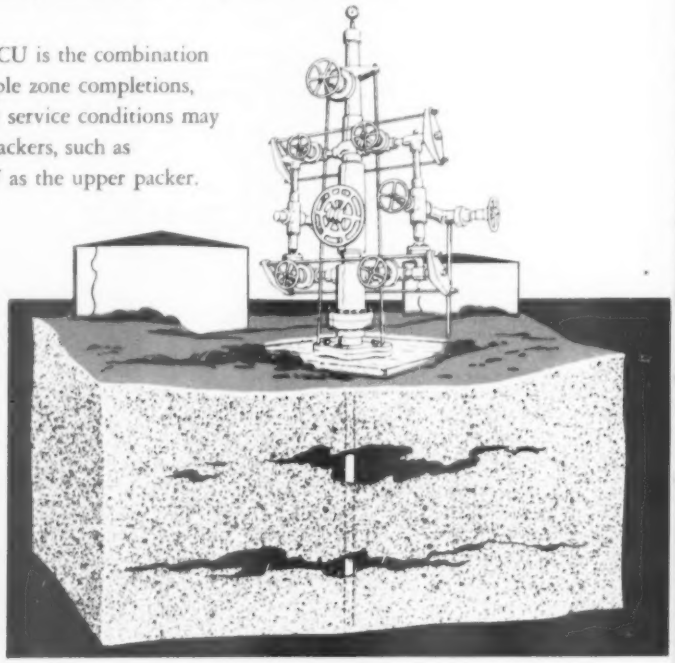

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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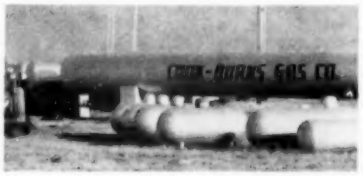

THIS picture really doesn't need any cutline. We're printing the actual photograph because otherwise people might not believe that this is really the name of a company and not just an advertising slogan. Cook-Burns Gas Co. is one of the largest distributors of L.P.G. in New Mexico, and these storage tanks are at its plant just outside of Lovington.

Oil Composition

WE'RE probably opening Pandora's box of troubles by doing this because we expect to be deluged with offerings from other proud parents, so we'll serve notice right now that we are not going to open this column to all bright sayings of oil men's children.

This was a composition by Casey Dwyer, 10-year-old son of Cornelius Dwyer who is the petroleum expert for the Foreign Operations Administration and author of a recent article in our favorite oil publication. We hope Casey's teacher gave him an "A" on this, for while his spelling drove our proofreader nuts, he seems to have grasped some of the fundamental principles of the oil business. Here it is, unretouched.

Volume I: Origin of Oil

Scientists think that oil began on the bottom of ancient seas. Little microscopic animals died and sank to the bottom and over a period of millions of years formed oil. Almost always oil is found in sands which were once the bottom of the ancient seas. Of course sometimes the oil moved underground. The reason most of the oil is found in Texas, Kansas, Oklahoma, and Louisana & California is because all these states were once submergerered for long periods of time. The first oil well was drilled in the Appalachian Mts by Col. Drake. People of his time thought he was crazy but from oil we now get many different products. Among them are: gasoline, Kerosene, furnace oil and asphalt and even sinthetic rubber. These are only a small part of the many products made from oil.

Volume II: Oil Wells

Oil wells may be drilled any place: in the middle of lakes and on the plains of Texas, from Iran to the U.S.A. Out of the many wells always being drilled only 1 out of 10 strike oil, so you see that oil people have to take great risks. Oil was not very profitabial many years ago. The gasoline was thrown in the river and drifted down the river to start fires. Then with the coming of the automobile the petrouleum business boomed. Gasoline was the princible product sold. Oil and all the others followed. Texas produces half of the oil used in the United States. When a oil well has dryed up or failed to strike oil the men sometimes put the derick on a tractor and haul it to another location. Now for the oil refineries, how they work and what we get from them.

Volume III. Oil Refineries

An oil refinerie is a very intresting place. It looks like a place full of steel bubbles and towers. It is here that the many by products of oil are made and separated. There is a tower which is very intresting but first I better explain how it works. You see gasoline is the lightest thing in oil, kerosene is next & furnace oil, ships oil and asphalt follow suit. Crude oil is poured in through a pipe and heated and since gasoline is the lightest it rises to the top and is caught and taken away. It is called the fractioning tower because it splits up the oil into the many fractions or by products int contains. There are many other intresting buildings which do very important and wonderful things.

—Henry D. Ralph.

Now... better than ever...

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SIDE SEALS REVERSED

to prevent distortion of seals by trapped fluid. Valve is easily removed.

MORE EFFECTIVE SEAL

The redesigned seal between the valve and the valve seat seals better—lasts longer—*stays in place* even under high circulating volumes and high pressures.

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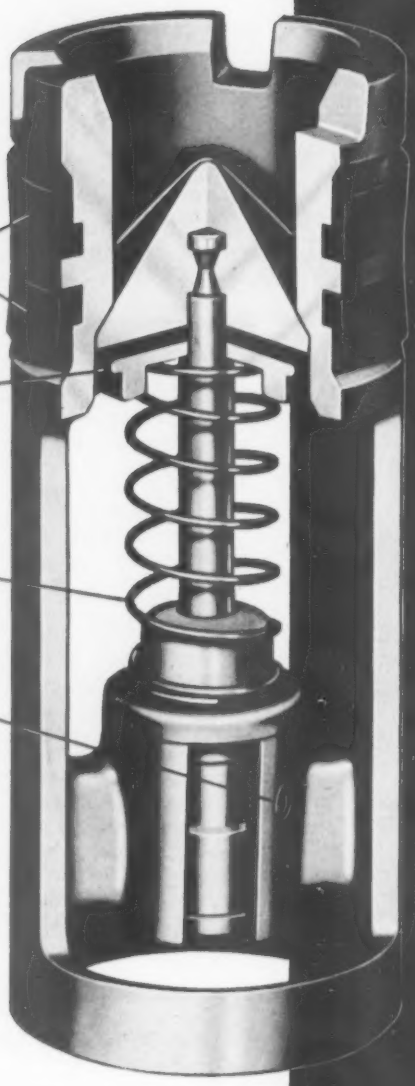
Reduces the cutting action of circulating fluid on the valve seal and seat.

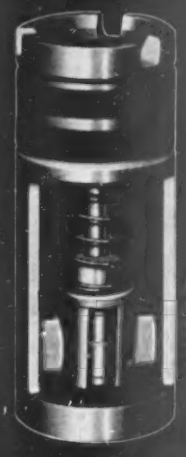
GUIDE POSITIVELY ANCHORED

The valve guide is securely held in place by the set screw.



New!

BAKER MODEL "F" DRILL PIPE FLOAT VALVE



Baker Model "F" Drill Pipe Float Valve, Product No. 4813

Suggestions of drilling contractor and drilling department personnel have helped in redesigning and improving Baker Drill Pipe Floats so that they are *now better than ever.* They will save *you* time and money, muss and fuss, in every string.

POSITIONED WHERE DESIRED—A majority of operators install the Baker Drill Pipe Float Valve in a recess in the lower end of the drill collar where it is held in position by the pin on the drilling bit. Or the Valve can be positioned in a Drill Pipe Float BODY which serves as a tool joint sub at any point in the string.

EASILY INSTALLED AND SERVICED—The strong, simple Valve is made without threads and is merely dropped into place—or just as easily removed—by hand. No tools or wrenches are required. The inexpensive wearing parts are available at your supply store, and servicing is quickly and easily done right on the derrick floor.

The Baker Drill Pipe Float does so much; saves so much; and costs so little that we suggest you...

PICK ONE UP AT YOUR SUPPLY STORE—TODAY

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Don't relax on gas regulation

DON'T be too optimistic about the action of the Supreme Court in agreeing to review the Phillips case placing gas producers under the jurisdiction of the Federal Power Commission. It does nothing but give the industry a stay of execution and a slight ray of hope.

It freezes the status quo, which means a few more months of uncertainty and inaction. There is virtually no possibility that the high court's decision, when it comes, will settle the controversy once and for all.

If the decision should go straight down the line of the industry's contentions and hold that Congress intended FPC to confine its regulation purely to transmission, then consumer advocates can be counted on to demand legislation specifically placing gas producers, gatherers, and processors under federal control.

If the decision affirms the lower court view that independent producers are already subject to utility rate-making rules, then the oil and gas industry will ask Congress to amend the law.

WHAT is even more likely is that the court will use some abstruse and weasel-worded language to try to reconcile the ambiguities of earlier decisions and reach a compromise on the issue of state versus federal regulation. This would satisfy nobody, and might generate still further litigation.

The several previous court decisions on this subject are so confused and conflicting that it is too much to expect that one more will completely clarify all the issues. And the question of regulating field prices of gas has become such a political football that it won't be quieted easily by any one action.

So the most the industry can expect from the court is a partial or temporary solution. The least it will have is a short respite from actual regulation.

THIS respite should be put to use. It is no time to wait meekly or hopefully. Producers should be working hard on alternative plans for action to cope with any turn of events. The lull after a successful skirmish is the best time to press ahead with a full campaign.

Most important is to convince consumers that they will get more and cheaper gas under the spur of free competition than under the dead hand of regulation. This has been explained before, of course, but not often enough nor forcefully enough nor in the right places. It will take a lot more consumer education to get the professional reformers off the necks of the gas producers.

Now is the time to redouble the agitation for fair treatment of gas producers. Lay the groundwork now for wide public support for the industry's position. It may be much needed soon.

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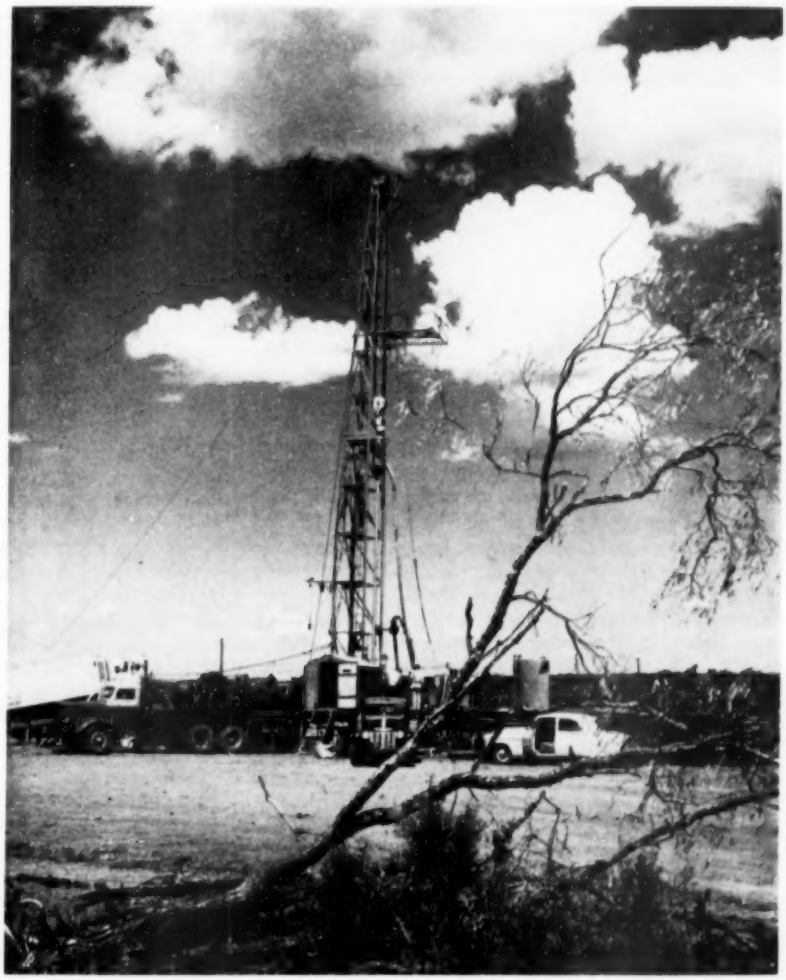
THIS WEEK... ...IN THE NEWS



RECORD-BREAKING RIG is Shell Oil Co.'s Rig 20, still going strong after more than 13 years of operation, during which it has drilled 1,222,500 ft., or nearly 232 miles. The unit is now drilling in South Texas' Big Foot field. For an outline of its unusual history, turn the page.

PRODUCTION—Drop in Middle East production in November causes Free World output to drop 58,000 bbl. daily in spite of slight gains in both United States and Venezuela . . . Kuwait production was off more than 7 per cent, accounting for the major portion of the drop. . . . ¶Stanolind may be the first to drill in the Gulf Coast's federally controlled Continental Shelf. . . . The company has applied to the U. S. Engineers for a permit to drill on a tract off Galveston County, 19 miles from the nearest land. . . . ¶Michigan's best Richfield limestone producer to date is completed in Skeels field. . . . The well is producing 200 bbl. daily. . . . ¶Skelly 6-A Lynch in Eddy County, New Mexico, is completed in the Pennsylvanian, a deeper pay than any production in the area. . . .

INTERNATIONAL—World's biggest-diameter crude-oil line will be built by Creole in Venezuela. . . . Contract let for 34-in. carrier to move heavy crude from Lagunillas field to main Creole terminal on Lake Maracaibo, 20 miles away. . . . ¶Brazilian law setting up government oil monopoly comes under attack by Rio attorney. . . . ¶Texas Co.'s former board chairman, Torkild Rieber, hired by Iranian Government as oil adviser. . . . Rieber scheduled to arrive in Iran early this month to assist in settlement of nationalization dispute. . . .

PIPE LINES—Tennessee Gas Transmission announces plans for 574-mile, 30-in. line from Gulf Coast to the Kentucky-Tennessee line. . . . New construction will roughly parallel part of existing system. . . . ¶Pasotex to complete 153-mile, 10-in. crude line from Snyder to Wink, Tex., this week. . . . ¶Orchard Pipe Line asks permit to build 45-mile, 8-in. crude line to connect Masters field with Sterling system. . . .

REFINING—Kerr-McGee begins a $4,500,000 expansion program at its Wynnewood, Okla., refinery. . . . Construction will include a new crude unit to increase crude capacity from 9,000 bbl. to 15,000 bbl. daily. . . . ¶Pan American Refining Corp. starts construction on its 21,000-bbl. Ultraforming unit at its Texas City refinery. . . . ¶Atlantic Refining Co.'s new 1,200-bbl. daily Catforming unit at Philadelphia goes on stream. . . .

GOVERNMENT—Randall Commission's report is much less on the "free trade" side than expected. . . . However, the report skirts the issues of oil imports and quotas. . . . Minority members of the commission, including Senator Millikin and Representative Reed and Representative Simpson, are bitterly critical of the report. . . . ¶The House ways and means committee is preparing recommendations on the oil industry's depletion allowance for the revised tax bill. . . . No change is expected in the recommendations. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,294,300 bbl. daily for week ended January 23, down 41,400 bbl. daily. . . . ¶Total well completions for the week increased 78 wells to 1,107, an all-time high. . . . Wildcat completions decreased 15 wells to 231. . . . ¶Rotary rigs operating in the United States dropped 133 rigs during week ended January 25 to 2,366. . . .

TRENDS—Primary stocks of kerosine, distillate, and residual fuels decreased 43,126,000 bbl. in the 5-week period ended January 23 compared with a reduction of 27,053,000 bbl. in the same period last year. . . . Additions to gasoline stocks were within 700,000 bbl. of accumulations in the period last year. . . .

Imports Cut Talked

Former I.P.A.A. president again visits New York to seek solution with major importers to question of foreign oil

NEW YORK.—Exploratory meetings were under way here last week between representatives of independent producers and the major importing companies with a view to finding a solution to the question of foreign imports.

Being discussed were several proposals submitted in a memorandum to each company by Charlton H. Lyons, retiring president of the Independent Petroleum Association of America, who for several months has been actively directing efforts to find a mutually agreeable arrangement by which imports could be reduced voluntarily.

It was reliably reported that the present discussions involved a suggestion that the import-fighting independents might be induced to drop their drive for congressional legislatoin provided the major importers would voluntarily cut their imports into this country below the level at which they "supplant" domestic production.

Companies cautious . . . The importing companies generally were reluctant to discuss the memorandum or Lyons' visit. Lyons would say only that preliminary meetings with individual companies "were encouraging."

One major company felt the proposals represented a softening in the independents' attitude that legislation limiting imports, whether by tariff or quota, is needed as a protection to the domestic industry.

Before discussions can go far, one representative said, there must be a closer definition of "supplant" in referring to the displacement by foreign oil of United States crude in the market. Also required, he said, is the separation of residual fuel and crude oil in any discussion of imports.

Lyons' visit to New York—at least the second since his plea for lower imports at the American Petroleum Institute annual meeting in November—was in line with a decision of the I.P.A.A. leadership at the association's directors' meeting recently in Midland, Tex. *(The Oil and Gas Journal, January 18, page 62).*

At this meeting directors voted to instruct association officers to pursue every possible means of solving the imports problem without resorting to an appeal for restrictive legislation. Should other means fail to achieve a cut in the flow of foreign oil, they indicated, the fight for a tariff or quota law probably would be resumed.

Brown urges cut . . . In an address before the World Trade Club in Cincinnati last week, the I.P.A.A.'s general counsel, Russell B. Brown, warned again that reliance on foreign oil would weaken the domestic industry and leave this nation unprepared in the event of a war.

"No one would consider building our airplane factories in the Middle East, yet that, in effect, is the course we are now pursuing as to oil," Brown declared.

The independents recognize the necessity for constantly increasing world trade, Brown said, but he added: "Whether through trade or aid, however, we must learn not to surrender our security."

Gas to Cost More

1954 contracts will be up 3 cents, T.G.T. head says

NEW YORK.—The natural-gas transmission industry will probably pay around 3 cents more in its field price for gas in 1954, Gardiner Symonds, president of Tennessee Gas Transmission Co., told the New York Society of Security Analysts November 27.

This means, Symonds said, that of the 75 cents to $1 that the consumer pays for his gas, an average of about 13 cents will be going to the producer. The higher field price should be reflected in a greater effort to discover and develop gas reserves.

Tennessee this year will pay from 10½ to 11 cents per M.c.f. for gas, compared to 9.5 cents in 1953, Symonds added. At the end of last year, the company had 262 gas contracts, an increase of 94 over the previous year.

Construction planned by the company during the year is expected to bring total capacity of the system up to 2 billion cubic feet as compared with 1,358 million cubic feet in 1953.

Symonds said the biggest problem facing the natural-gas industry is that of financing its expansion requirements.

Shell Claims a Record . . .

Rig 20 Set Some Unusual Marks

HOUSTON.—An all-time drilling record for a rotary rig is claimed by Shell Oil Co. for its portable Rig 20.

The rig, for example:

. . . **During 1953** drilled 98 wells in Big Foot field of Frio County, with a total footage of 331,316 ft. During the 12-month period the rig had 354 drilling days, averaging 3.62 days per well. The average hole depth was 3,380 ft.

. . . **Since 1940** has drilled 495 holes, with a total footage of 1,222,500 ft., or roughly, 232 miles.

. . . **Has drilled** 189 of the 200 wells now completed in Big Foot field, recording a total footage in this one field of 621,905 ft.

The rig with the unusual history (picture on page 37) is a trailer-mounted Franks portable with a 90-ft. mast. According to Shell, the rig has had a "colorful history of drilling in most of the major oil-producing areas of the Midwest, South, and Southwest."

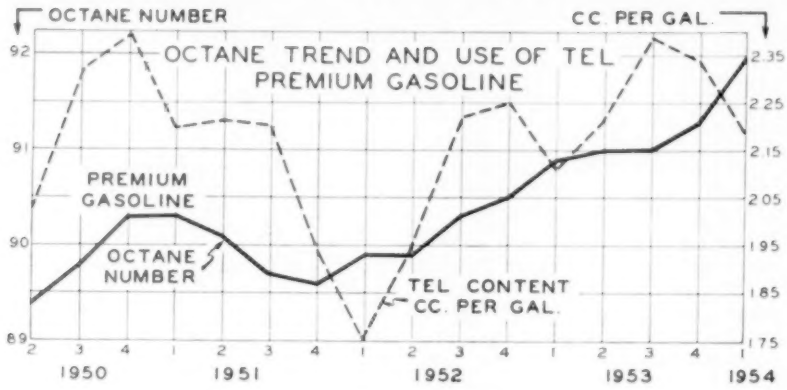
The rig has been in service since November 1940, in Oklahoma, Kansas, Michigan, Louisiana, Mississippi, and Texas. In Texas it has drilled at Holiday, Quitman, Kilgore, Gladewater, and Alba, in addition to Big Foot.

Other data . . . In 1949, the rig drilled three wells in 28 days, totaling 10,070 ft., for an average of 9.33 days per well; in 1950 it drilled 28 wells in 169 days for a total footage of 91,390 ft., averaging 6.04 days per well; in 1951, 43 wells in 227 days totaling 143,466 ft., averaging 5.27 days per well; in 1952, 14 wells in 67 days, totaling 45,663 ft., averaging 4.79 days per well.

The most footage ever cut in an 8-hour tour was 2,160 ft., and the fastest well was drilled in 20 rotating hours. The fastest move was made in 4 hours, and the most wells drilled in any one month were 10.

Present drilling foreman on the rig is H. W. Mitchell. Drillers are C. H. Miller, Ed Fose, Claude Simpkins, and Joe Justice.

Octane Numbers Still Going Up



COMPARISON OF MOTOR-GASOLINE SURVEYS

(Octane numbers are by research method, arithmetic averages by cities)

	Premium				Regular			
	Octane number			TEL cont. cc./gal.	Octane number			TEL cont. cc./gal.
	Jan. 1953	Oct. 1953	Jan. 1954	Jan. 1954	Jan. 1953	Oct. 1953	Jan. 1954	Jan. 1954
Aberdeen	90.0	88.9	89.9	1.97	83.3	83.1	82.8	1.36
Amarillo	89.4	90.0	89.6	2.14	81.5	81.4	81.6	2.19
Atlanta	92.5	92.8	93.5	2.12	85.3	85.8	86.7	2.26
Bakersfield	89.2	89.8	90.4	2.80	80.6	81.8	82.0	1.45
Baltimore	92.4	93.1	94.3	2.39	86.8	87.5	81.1	1.94
Boston	92.7	92.9	94.0	2.20	87.6	87.4	88.1	1.94
Calgary	86.6	88.2	88.4	2.89	81.3	82.5	82.9	2.58
Casper	89.0	89.0	89.5	1.65	82.2	82.0	82.0	1.40
Charlotte	92.5	92.4	93.6	2.25	85.3	85.8	86.4	2.45
Chicago	90.4	90.6	90.4	2.04	83.8	84.0	83.8	1.89
Cincinnati	92.2	91.8	92.6	2.38	86.6	86.6	87.4	2.20
Cleveland	92.8	92.4	93.3	2.40	87.4	87.6	87.6	1.88
Columbus	92.0	92.1	92.8	2.36	87.6	86.7	87.2	1.96
Corpus Christi	91.9	92.1	93.3	2.58	84.6	84.8	84.9	2.17
Dallas—Fort Worth	92.4	92.9	94.0	2.33	84.5	84.9	86.0	1.67
Denver	89.7	89.2	89.4	1.64	81.1	81.8	81.5	1.39
Detroit	92.3	93.1	93.1	2.04	87.0	86.8	87.2	1.59
Edmonton	87.1	90.1	89.5	1.86	82.5	83.3	83.4	1.18
El Paso	90.6	90.2	91.4	2.13	81.3	81.3	81.7	2.17
Great Falls—Billings	90.7	90.9	91.6	1.52	83.0	83.3	83.9	1.38
Houston	92.1	92.6	94.1	2.36	85.2	85.3	86.3	2.05
Indianapolis	90.0	89.9	90.9	2.08	84.0	83.8	83.9	2.03
Jacksonville	92.3	92.0	93.3	2.23	85.8	86.0	86.5	2.09
Kansas City	90.1	90.4	90.9	1.87	83.3	83.8	83.8	1.88
Little Rock	91.7	92.5	94.1	2.45	85.4	85.3	85.7	2.08
Los Angeles	90.8	91.7	91.8	2.25	82.8	82.8	83.2	1.76
Louisville	91.8	92.0	93.3	2.55	86.1	85.4	86.1	2.47
Memphis	91.6	91.9	93.2	2.42	85.4	85.0	85.1	2.10
Milwaukee	91.4	94.0	93.6	2.29	83.9	84.2	83.7	1.87
Minneapolis	89.9	89.9	90.4	2.00	83.4	83.6	84.0	1.61
Montreal	90.3	91.8	92.6	1.66	86.3	86.6	86.7	0.96
Nashville	91.8	92.2	93.5	2.46	85.2	84.8	85.1	1.98
New Orleans	91.6	92.5	93.3	2.47	85.7	85.8	86.1	2.32
New York, N. Y. (Met. area)	92.2	92.8	93.7	2.44	87.0	87.4	87.8	1.94
Omaha	89.6	89.6	89.8	1.91	82.7	83.6	83.3	1.46
Philadelphia	92.3	92.7	94.3	2.42	87.1	87.4	87.9	2.13
Pittsburgh	92.1	92.3	94.2	2.21	87.3	87.6	88.2	2.23
St. Louis	90.1	90.3	90.6	2.05	83.9	83.6	84.2	1.96
Salt Lake City	87.9	88.7	88.6	1.46	79.7	80.4	81.2	1.17
San Francisco	91.4	91.8	91.9	2.56	82.4	82.3	83.0	1.95
Seattle	90.7	90.9	91.1	2.55	82.0	82.0	83.1	1.80
Shreveport	91.6	93.3	94.5	2.65	84.9	84.6	85.8	2.22
Spokane	90.1	90.8	91.4	1.65	82.9	82.3	82.8	1.35
Toronto	90.3	91.6	92.1	2.10	86.4	86.8	86.6	1.70
Tulsa	90.2	90.8	91.4	2.02	83.1	84.0	83.5	1.91
Vancouver	89.0	90.0	90.6	2.41	82.7	83.1	83.1	2.03
Wichita	89.2	89.6	90.2	2.11	82.7	83.0	83.2	1.34
Winnipeg	88.8	90.4	90.9	1.82	84.7	84.8	85.2	1.12

OCTANE numbers of both premium and regular gasoline continue the general upward trend that has existed for the past several years, according to the latest quarterly survey by the petroleum chemicals division of E. I. du Pont de Nemours & Co., Inc.

Unweighted average of research octane numbers of premium gasoline in 48 cities was 92.0 as of the first of January compared with 91.3 at the beginning of the fourth quarter of 1953 and with 90.8 at the first of last year.

Only two cities had premium gasoline with lower average octane numbers at the first of this year than a year ago. Samples from Chicago averaged the same as last year, and the other 45 cities were all receiving higher-octane premium than at the start of last year.

GENERAL COMPARISONS*

	Jan. 1953	Oct. 1953	Jan. 1954
Premium:			
Research Oct. No.	90.8	91.3	92.0
TEL content (cc. per gallon)	2.10	2.34	2.19
Regular:			
Research Oct. No.	84.3	84.5	84.8
TEL content (cc. per gallon)	1.78	2.02	1.85

*Unweighted averages of 48 cities.

Premium gasolines marketed on the East Coast had the highest average octane numbers. The eight cities from District 1 had an over-all average of 93.86. District 3 or the Gulf Coast followed with an average of 93.04. District 2, including the Mid-Continent and North Central states, averaged 91.76 or a little higher than the 91.32 reported for the West Coast cities in District 5. The average for the four cities reported from District 4, Rocky Mountain states, was 89.77 or slightly under the average of 90.68 for the eight Canadian cities included in the report.

The accompanying chart shows the octane trend for premium gasoline. The average has moved up to 92.0 for the 48 cities included in the latest report compared with 89.4 for the 45 cities covered by the report at the end of the first quarter of 1950. Average TEL used per gallon is shown by the broken line on the chart.

Regular gasoline in the 48 cities had an average research octane number of 84.8 on the latest survey compared with 84.5 at the first of last October and 84.3 a year ago.

Oil Outlook Bright

'54 will be a good year if depletion allowance is kept, imports are cut, and FPC control avoided, Thompson says

TULSA.—The oil industry will have another big year in 1954 if three threats fail to materialize, Lt. Gen. Ernest O. Thompson told the Engineers Club of Tulsa here last week.

The Texas Railroad Commission chairman said at least one thing is certain: "There is no shortage of oil or gasoline now or in the foreseeable future."

The threats, Thompson said are:

". . . **The ever-present threat** to depletion recognition in the tax law.

". . . **The flood of imports** that threaten to supplant domestic production.

". . . **Federal control** of the oil and gas industry through the application of the Natural Gas Act by the Federal Power Commission in the fixing of wellhead prices for gas."

The bright side . . . He said the ways and means committee of the House of Representatives has recommended repeatedly that the depletion recognition in the tax law be "not disturbed or tampered with."

The U. S. Supreme Court has granted a rehearing in the Phillips case, putting "in status quo or in deep freeze for the time being" the threat of federal control, he said.

Of imports, Gen. Thompson said, "Business statesmanship is beginning to bear fruit in restraint. More of this restraint must be promptly shown if federal restrictions are to be avoided.

"I wish to compliment the heads of some of the importing companies on their efforts at stopping this flood of foreign oil. The answer lies entirely in their hands. By this I mean in the hands of the executives of the few importing companies. Their good faith in only supplementing domestic crude and in not supplanting domestic crude means the difference between a good and a bad year in 1954."

Shutdowns ruinous. . . He added, "It is my opinion that domestic crude is being supplanted whenever the flood of imports is so great that the domestic oil-producing states are forced to reduce their allowables so low that the operators cannot continue to develop their properties in a healthy, prosperous domestic oil-producing industry."

Gen. Thompson said Texas is producing only 17 days in January and will be producing only 15 days in February —"a 50 per cent shutdown." He said, "Half-time operation is ruinous."

He outlined the Texas conservation practices and its market demand statute, and praised the recent action of Oklahoma in making a thorough check into its conservation matters. *(The Oil and Gas Journal, January 18, page 52).*

Michigan Strikes

Independent completes one Richfield, two Dundee pays

MOUNT PLEASANT, Mich. — The Skeels field, Clare and Gladwin counties, has furnished Michigan with two significant oil wells, both drilled by the same independent operator.

One, the Don Rayburn 1 Frier, N½ SW SE 25-20n-3w, is considered the best Richfield limestone producer ever completed in Michigan. It is a southwest diagonal offset to the 1 Meyer discovery.

The well is being produced through an intermitter at an average of 200 bbl. daily at 5,103 ft. after approximately 26 ft. of stringer pays were perforated and acidized with 5,000 gal.

The second new Skeels producer, 1 Roemelen, S½ SE NE 25-20n-3w, showed Dundee dolomite pay at 3,871-89 ft. The Dundee was topped at 3,865 ft. The well, a north 40-acre offset to the Richfield discovery, flowed 500 bbl. of oil in 12 hours before the hole had been completely cleaned of drilling mud.

North Adams completion . . . In addition to the two Skeels producers, Rayburn offset a 12-year-old light producer on the northeast edge of the North Adams pool, Arenac County, and completed the B-2 State-Adams in the Dundee. The well was drilled to 2,976 ft., total depth after the Dundee was topped at 2,926 ft. and pay showed from top to bottom. The well produced at the rate of 100 bbl. of oil an hour after a 3,000-gal. acid treatment.

Rayburn is one of the discoverers of the prolific North Adams and Deep River Dundee pools of Arenac County.

Journal to Reopen Dallas Editorial Office

THE OIL AND GAS JOURNAL will reopen its Dallas editorial office February 1.

Robert J. Enright, a member of the Journal's central news staff in Tulsa for the past 3½ years, will be in charge of the office as district editor.

Son of a Kansas drilling contractor, Enright began his oil-field experience at an early age as a roustabout and later tool dresser on a cable-tool rig. He later was associated with Cities Service Oil Co. and an independent firm, Barbara Oil Co., in the Greenwood County water-flood area in eastern Kansas.

He holds a bachelor of science degree in journalism from the William Allen White School of Journalism and Public Information at the University of Kansas, Lawrence. Just prior to joining the Journal, he was news editor for the Johnson County Democrat, Olathe, Kans.

Enright moved to Dallas last week.

Headquarters of the Journal in Dallas will be at 1238 Mercantile Bank Building.

Middle East Report

It's no big threat to domestic oil, Jennings says; unusual costs, high "royalty," distance all oppose large imports

NEW YORK. — Distance, costs of operation, and high government payments all work against large-scale movement of crude oil from the Middle East into the United States, B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., said here January 28.

Speaking on "Economic Aspects of Middle East Oil" at a regional conference of the New York Society of Security Analysts, Jennings said that while the so-called lifting cost in the Middle East is very low, there are many other factors making total costs relatively high.

Operators in this region must provide virtually everything required by human beings to live, including a large part of all housing, utilities, communications, hospitals, schools, and in many cases churches. The outlay for these "amenities" may well equal that in the producing facilities themselves.

Profits normal . . . With the rapid increase in their revenue from the industry, practically all Middle East countries now obtain some 50 per cent of over-all profits of the venture. These payments, Jennings said, come to a very substantial number of cents per barrel on the oil produced.

"Because conditions in the various concession areas differ somewhat and also because bookkeeping is neither an exact science nor a standardized procedure, I shall not attempt to give precise figures on f.o.b. costs in any of these countries," he said. "I will say, however, that they are high enough so that taking oil at the points of loading at the posted price, the profits realized by the operators in the Middle East are no higher per barrel than are those normally to be expected in the Western Hemisphere, such as in Venezuela, the United States, or Canada."

Freight problem . . . The Socony-Vacuum president pointed out that Persian Gulf oil is 8,500 miles from New York, 10,000 miles from the Gulf Coast, and still farther from the Pacific Coast.

On the subject of tanker rates, he said the variation since the end of the war gave a range of between $6.05 and 86 cents for the transportation of Persian Gulf oil to New York or Philadelphia.

Today, with depressed tanker rates, 36°-gravity Arabian crude has a laid-down cost in the United States of $2.94, but the lower quality of most Middle East crudes offsets some of the 25 to 40-cent advantage presently held by Middle East oil over domestic crude.

"These very low freight rates seem unlikely to continue for any appreciable time," Jennings said. "Even the newer ships now being built, the supertankers, would have to get something approaching U.S.M.C. to pay all charges, including depreciation and earn a satisfactory return on the investment."

Spot problem . . . Citing current imports from all sources as about 650,000 bbl. daily crude and 400,000 bbl. daily residual, Jennings said his own view is that the present situation is definitely "a spot situation and one which will not long continue."

Jennings said he doubted if anyone could say with assurances of accuracy when Iranian production will be resumed. He said he personally expected that when and if Iranian oil does come back, it will be readily absorbed.

"A property of that magnitude which has lain idle for some 2½ years cannot be brought up to anything approaching full capacity for many, many months," he said. "Furthermore, the growth of the Middle East oil industry during those years has been so great that the Iranian production potential will constitute a much smaller factor in the over-all picture than it did in 1951."

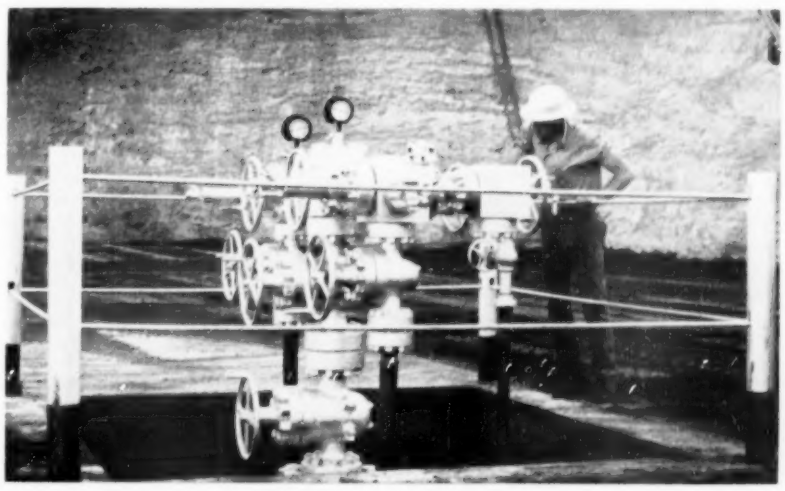
Industry Briefs

TORONTO.—Shell Oil Co. of Canada has acquired the assets of Shell of Newfoundland. The latter, formerly controlled in the United Kingdom, supplies aviation products to the Gander airport. The transaction includes a marine storage terminal at Lewisporte and a storage plant at Gander.

WICHITA, Kans. — A 10,000-bbl. daily increase in Kansas's allowable for February was ordered last week by the state corporation commission. The February figure is 325,000 bbl. a day, which coincides with the Bureau of Mines forecast of demand. T. A. Morgan, conservation director, told the commission the 325,000-bbl. figure is the maximum the state's fields could produce without waste. Purchasers' nominations for February were 308,434 bbl. daily, down slightly from January.

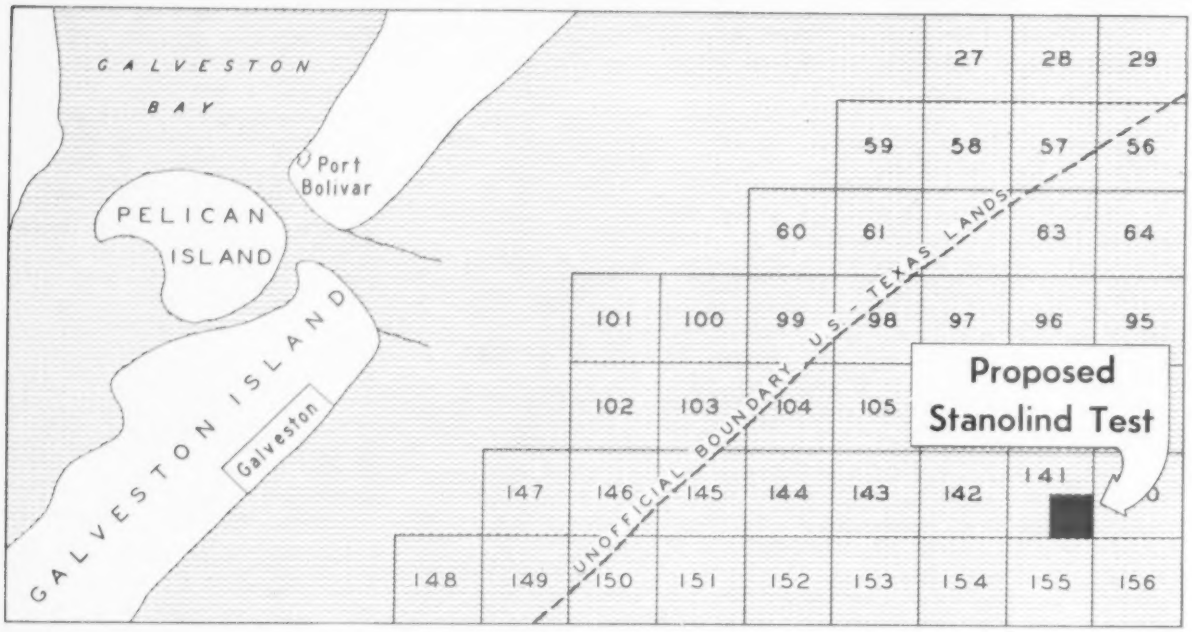
WICHITA, Kans.—The Kansas Oil Men's Association has passed a resolution calling for repeal of all federal taxes on gasoline and other motor fuels. The resolution said gasoline taxation is a field which should belong to the states and that time has shown that such funds can be spent more efficiently on a state level.

SANTA FE, N. M.—The New Mexico Oil Conservation Commission has retained a 40-bbl. per day basic oil allowable for the state during February, increasing over-all state production to about 202,000 bbl. a day, a hike of about 4,000 bbl. a day over January.



Shell Christmas Tree Is Biggest on West Coast

This Shell Oil Co. christmas tree near Ventura, Calif., is believed to be the only operating type capable of handling test pressures of 15,000 psi. and working pressures of 10,000 psi. It was designed to handle the highest pressures on the Pacific Coast.



First Texas Shelf Test Staked

William P. Sterne

HOUSTON.—Stanolind Oil & Gas Co. may become the first oil operator to drill in the federally owned Continental Shelf lands outside the 10½-mile line off the Texas coast.

Stanolind has filed applications with the U. S. Army Corps of Engineers for permission to drill from offshore platforms off both Texas and Louisiana, it was disclosed last week.

Current plans call for drilling off Galveston County, Texas, on State Tract 141 in State Lease 31,592, which lies about 25 miles due east of Galveston and 19 miles from the nearest land. The federal Government's designation of this lease is "OCS 0273." The "OCS" means "on Continental Shelf." The company is also seeking permission to drill in an area off Cameron and Vermilion parishes, Louisiana, about 10 miles from shore, at a location that practically straddles the parish lines.

The company has advertised for bids on an 83 by 82-ft. drilling platform for installation at the Texas location. The platform will be of the "template" type. Water over the Texas tract is approximately 50 ft. deep.

No date set . . . No actual date for the start of operations in the United States-owned waters has been set as yet, Stanolind said. After the permits are issued by the Army Engineers, the Interior Department must issue another permit for each area. Interior has not yet issued its general regulations providing for oil operations in federally owned areas. (See National Affairs).

Stanolind has held its leases off Galveston Island, Texas, and off Cameron-Vermilion parishes, Louisiana, since 1947, and they have been recognized by the federal Government. More recently, the company has acquired other leases off the Texas coast, but these are closer to shore. No drilling plans have been announced for any other locations.

Both the Texas location and the one off Louisiana involved in the new applications are well within the area controlled by the U. S. Government.

First entry . . . This is the first application by an offshore operator for a federal permit to drill on the outer Continental Shelf off Texas. Under the provisions of the Submerged Lands Act, Texas has jurisdiction of lands up to 3 leagues (10½ miles) from shore. Louisiana has control of its offshore lands out to the 3-mile limit.

The Texas Land Office has been careful in keeping clear of the theoretical 10½-mile boundary. In fact, Texas leases have been awarded to bidders only up to the 9-mile limit from shore. This leaves a 1½-mile buffer zone between Texas-owned and U. S.-owned lands.

The Stanolind applications are significant in that:

. . . They mark the first definite step by an offshore operator toward drilling on lands which, under terms of the present law, are controlled by the U. S. Government.

. . . They give substance to the many rumors of plans by a number of offshore operators for drilling far out on the Continental Shelf, where the water is much deeper.

. . . More such applications could influence the Texas General Land Office as to future leasing policy. Many choice leases lie near the border between U. S.-owned and Texas-owned lands and these have not been leased because of the state's desire to leave a buffer zone.

Interest in gulf . . . Stanolind's applications are indicative of the major companies' interest in Gulf of Mexico possibilities. Many have extensive holdings acquired prior to the ownership squabble and are making plans to develop their leases in the future.

There have been no commercial oil discoveries off the Texas coast to date, and most production activity has been centered off the shores of Louisiana.

The only major offshore work at present is being carried on by The California Co. and Shell Oil Co. off Latourche and Plaquemines parishes, Louisiana.

Two other companies — Gulf Oil Corp. and Standard Oil Co. of Texas — have filed for permits to install drilling platforms off the Texas coast. But in both instances, locations are on lands within state jurisdiction.

Annexation Review Set

AUSTIN. — The Texas Supreme Court will decide whether the city of Deer Park, near Houston, may annex the sites of nearby plants of Shell Oil Co. and Shell Chemical Co.

The court agreed, at the city's request, to review a Waco Court of Civic Appeals ruling against the city. The trial court prevented enforcement of Deer Park's annexation ordinance and granted the companies a permanent injunction against annexation. The Appellate Court upheld the trial court in ruling the annexation invalid, but overruled it on the permanent injunction.

Shell operates a 125,000-bbl. refinery and a chemical plant at Deer Park.

Synthesis Plant Planned

STERLINGTON, La.—Commercial Solvents Corp. has announced it will build the first large-scale facilities for synthesizing nitroparaffins from natural gas here.

Products of the plant will include nitromethane, nitroethane, 1-nitropropane, 2-nitropropane, and nitrobutane. Derivatives will include aminohydroxy compounds and hydroxylamine salts.

Louisiana Trims Allowable

BATON ROUGE, La.—Louisiana's crude-oil production allowable for February was cut last week from 666,427 bbl. daily in January to 653,690 bbl. daily by John B. Hussey, state conservation commissioner.

The new allowable is expected to result in an estimated crude-oil production of 624,690 bbl., and an estimated production of 77,600 bbl. of other liquid hydrocarbons.

Calco Requests Extensions

NEW ORLEANS.—The California Co. has asked the U. S. Engineers for a 3-year extension of permits for the installation of seismograph equipment in both offshore and coastal lands on the Louisiana Gulf Coast.

Mid-Winter Work Speeds Yellowstone Pipe Line

Members of an Eastern Pipe Line Contractors crew were working in 17° weather when this picture was taken near Missoula, Mont., as they tied in a stream crossing on the 530-mile, 10-in. Billings-to-Spokane products line. In most other areas along the line work had been suspended, with a resumption planned in March or April, but Eastern still was at work on its section in mid-January. At present 151 miles of pipe have been laid. Completion is scheduled for September. The system will be owned jointly by Interstate Oil Pipe Line Co. and Continental Oil Co., each with a 40 per cent interest; Union Oil Co. of California, with 14 per cent, and W. Turner Clack, 6 per cent. The line will connect Billings area refineries with the big Pacific Northwest marketing area.

The company has more than 50 leases totalling more than 150,000 acres in the Gulf of Mexico area.

Four major areas to be covered by seismograph crews are involved in the application for permits. All are within the 3-mile limit from shore.

Two offshore areas involved are a tract 60 by 50 miles southwest of Golden Meadow, La., and a tract 30 by 15 miles south of Grand Isle, La.

The coastal tracts covering bays and inlets are an area 86 by 42 miles located about 12 miles northeast of New Orleans in St. John the Baptist, St. Tammany, St. Bernard, Orleans, Jefferson and St. Charles parishes. A second area is 90 by 30 miles located about 18 miles southwest of Franklin, La., in Terrebonne, St. Mary, Iberia and Vermilion parishes.

Louisiana Fights Decision

BATON ROUGE. — The Louisiana Supreme Court will have to decide whether or not the Louisiana Mineral Board must accept deferred payment and reinstate Stanolind Oil & Gas Co.'s leases off Terrebonne Parish.

The Supreme Court's decision will not only settle Stanolind's case, but others involving about 30,000 acres of offshore leases in similar circumstances.

A Baton Rouge District Court ruled that the state must accept Stanolind's offer of back rentals on the leases and reinstate the leases. The state attorney general has announced he will appeal this decision to the state Supreme Court.

The Louisiana Mineral Board refused to accept the payment and Stanolind brought suit to regain the leases. The District Court ruled that the Mineral Board had no right to refuse back payment of the lease rentals.

High-Pressure Lab Started

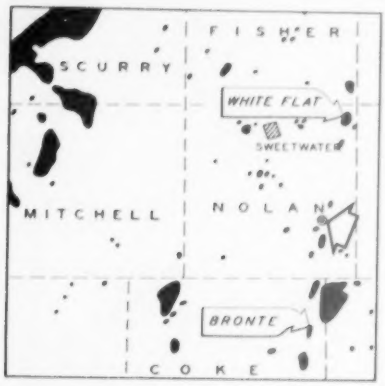
TEXAS CITY, Tex.—Construction has started on a new high-pressure research laboratory for Pan American Refining Corp. here, according to Dr. P. C. White, manager of research and development.

Dr. White said chemical reactions under high pressure will be studied in the new building as a part of the expanded research program at Pan American. The new building will be adjacent to the company's new research laboratory.

Gulf Coast Unit Approved

AUSTIN. — The Texas Railroad Commission has approved a unitization agreement covering 3,510 acres in the Karon (Luling sand) field of Live Oak County in the Gulf Coast area which is expected to result in production of an additional 1,000,000 bbl. of oil.

The agreement, submitted in December by Stanolind Oil & Gas Co., is designed to put into effect a crestal gas injection.



CAMBRIAN DISCOVERY (arrow), between the only two current Cambrian producing areas, in Kilroy Co. of Texas 1 Roberts.

Cambrian Extends

Coke-Nolan County leasing spurred by new completion

SWEETWATER. — Another Cambrian sand strike along the north-south trend of fields stretching from Coke through Nolan County has returned the spotlight to this West Texas area, known to be underlain with thick Cambrian beds. *(See Lower Cambrian Shows New Promise, The Oil and Gas Journal, August 17, 1953.)*

Completion of Kilroy Co. of Texas 1 Roberts (arrow on the map) for a daily flowing potential of 1,292 bbl. of high-gravity oil has spurred leasing in an already lease-tight area. Humble Oil & Refining Co. paid Texas Pacific Land Trust a reported $1,002 per acre for 160 acres, which is the northeast quarter of Section 15, Block Z, T&P Railroad Survey. On this lease Humble will drill a diagonal southwest offset to the discovery.

Leasing of TXL land to Humble came as a surprise to operators, as Texas Pacific officials have been working out the details of forming an exploration and producing company. During recent months the firm has made few leasing deals on promising acreage.

Attractive features of Cambrian production include its economic depth of around 6,000 ft., high permeability and thick pay sections (up to 200 ft. at White Flat field, northeast of Sweetwater).

The driller who shoots for Cambrian oil also has six other objectives, ranging through the Pennsylvanian and Ordovician. White Flat production is from six separate zones and at least two of its Cambrian wells have been dual completions.

Bronte field in Coke County is also a multiple-pay area and was the first in this trend of fields to find commercial production from the Cambrian. For additional details see Field Section, this issue.

Old Field, New Pay

Skelly's Eddy County well is Pennsylvanian discovery

HOBBS, N. M.—Reshooting, reworking and redrilling is steadily adding to the list of discoveries from new pays in old oil fields, usually from a much greater depth than developed acreage around it.

Last week Skelly Oil Co. added another discovery of this type at its 6-A Lynch, in the Fren sector of Eddy County. On 24-hour test the well flowed 196 bbl. of high-gravity oil, plus 4,000,000 cu. ft. of gas. Pay section was the Pennsylvanian at 11,962-11,982 ft. Most of the immediate area around this well has not been explored below the middle Permian.

Last year Stanolind Oil & Gas Co. 1-AB State found similar production on the southeast flank of Red Lake field, 20 miles to the west. The new deep pay here was also Pennsylvanian and potential was 810 bbl. daily plus 30,000,000 cu. ft. of gas.

Current deep explorations around the Red Lake discovery include two by Stanolind and one by San Juan Drilling Co.

Storage Cavities Approved

AUSTIN.—Approval has been granted by the Texas Railroad Commission for underground L.P.G. storage in cavities to be washed out of salt sections in three West Texas counties.

Additional cavities in the sections may be leached out as they are needed without further hearings.

In Reagan County El Paso Natural Gas Co. was authorized to store L.P.G. in a 150,000-bbl. cavity at 1,300 ft. near the firm's Midkiff natural-gasoline plant.

Texas Gas Products Corp. received approval for a 100,000-bbl. cavity from 1,280 to 1,305 ft. deep in the old Floyd Weiner field of Glasscock County.

Texas Gas Products also may store in another 100,000-bbl. cavity at 1,500 ft. in the Pembrook field area of Upton County.

Flood Permit Requested

AUSTIN, Tex. — A Strawn sand water-flood program expected to recover 333,000 bbl. of additional oil has been proposed for Regular field in Throckmorton County, Texas.

The field has a productive area of about 133 acres and is said to be about 97 per cent depleted by primary recovery after production of 257,031 bbl. of oil through November 1953.

Plans, submitted to the Texas Railroad Commission call for injection of about 150 bbl. of water per day through each of four wells in the field. About 110.7 acres would be flooded under the program.

Project Approved

Gas-injection program for Fullerton field authorized

AUSTIN, Tex.—The Texas Railroad Commission has approved a 25,000-acre unit agreement in the Clearfork zone of Fullerton field in Andrews County of West Texas for a gas injection pressure-maintenance program.

Fullerton Oil Co., which owns approximately 20.4 per cent interest in the unit, will be the operator. A pilot water flood also was given commission approval.

The field's 6,800 to 7,250-ft. Clearfork pay was discovered in 1942 and had yielded about 79,000,000 bbl. by January 1. Testimony at the hearing on the unit agreement was that the unitized pressure-maintenance program will recover 32,400,000 bbl. of oil more than expected by primary recovery methods.

Unitization of the Clearfork zone was approved by companies owning

more than 95 per cent operating interest in the unit, and by more than 97 per cent of the royalty interests.

Stanolind Oil & Gas Co., with 23.5 per cent, holds the largest interest of the 33 participating operators. Other companies having an operating interest of 2.5 per cent or more are:

Gulf Oil Corp., 2.548; Humble Oil & Refining Co., 2.993; Magnolia Petroleum Co., 7.346; Mid-Continent Petroleum Corp., 3.846; Ohio Oil Co., 4.749; Phillips Petroleum Co., 9.592; Sinclair Oil & Gas Co., 3.622; Superior Oil Co., 3.152; The Texas Co., 3.768; and Texas Pacific Coal & Oil Co., 3.669 per cent.

Continental Oil Co., with a 1.687 per cent interest, and Humble were the principal operators not signing the agreement in advance of the hearing.

Wildcat Adds Oil Creek Pay

WHITESBORO, Tex.—The Howell, Holloway & Howell 1-A Freeman, a wildcat ½-mile north of Southmayd, has added another Oil Creek sand field to the growing trend of fields across the northern half of Grayson County.

On a potential test through an 18/64-in. choke the well flowed 264 bbl. of 32° gravity oil daily from perforations at 6,765-95 ft. with a gas-oil ratio of 992:1. The nearest Oil Creek production is Sandusky field, 7½ miles to the northwest.

ROCKY MOUNTAIN

Morgan County New Hot Spot

DENVER.—Morgan County, Colorado, has replaced Adams and Washington counties as the hottest spot in the Denver-Julesburg basin.

The southern portion of this county is one of the most active areas in the Rocky Mountains as a result of new recently opened producing sections in the Adena area.

Johnson, Baumgartner and Gaddis tested two wells last week in the Adena area for more than 900 bbl. of oil daily. The 1 Glenn, SE SE NW 32-2n-57w, made 966 bbl. of oil in 24 hours through 32/64-in. choke from perforations at 5,505-09 ft. The 2 Glenn flowed 1,062 bbl. of oil per day on ½-in. choke from 5,522-32 ft. Six new tests have been staked in this general area of Morgan County in the past week. Four pool wells have been located, also, promising further development increases despite the bitter weather.

It is thought that the Adena-North Adena-Glenn Ranches, and West Fork make up one producing area, similar to prolific Little Beaver and Badger Creek, 1953's hot spot in the Denver-Julesburg basin fields of Adams and Washington counties. Goodall Pipe Line Co. has completed a pipe line to Merino field, giving outlet to Little Beaver and this new Adena Morgan County area.

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Gas Producer Indicated

DENVER.—Colorado's portion of the Anadarko basin has another indicated gas producer in Southwestern Exploration Co.'s 1 State "B," NW NW SE 16-32s-41w, Baca County.

The indicated strike is in extreme southeastern Colorado about 1½ miles west of the Morton County, Kansas, line in the prolific Greenwood field gas area.

The Greenwood field was recently extended into Colorado's portion of the Anadarko basin by the Amerada and British-American 1 Neu, Baca County. The well flowed at the rate of 4,000 M.c.f. of gas per day.

North Dakota Leases Sold

BISMARCK, N. D.—Stanolind Oil & Gas Co. paid $335,752 for oil and gas leases on 7,573 acres of state school land at the first 1954 auction held by the North Dakota Board of University and School Lands.

The state collected a total of $623,341 for the 33,914 acres offered. Of that $613,743 was in bonuses, the balance in first-year rentals at 25 cents per acre and publication costs.

Reflecting recent oil shows and discoveries in the deep portion of the Williston basin, the most spirited bidding came on acreage in southwestern North Dakota and in McKenzie County.

Stanolind paid $209,595 in bonuses for 5,906 acres in Billings County, $1,360 for 480 acres in Slope County and $122,574 for 1,187 acres in Stark County.

Top bid was Stanolind's $162.50 per acre or $103,522 for 637 acres in section 16 T. 137 N. R. 99 W. Stark County, about two miles southwest of a 1953 dry hole drilled by Plymouth Oil Co.

Stanolind's bidding was concentrated in an area which has had intensive recent and current seismic exploration. Its chief competitor was Skelly Oil Co. T. N. Jordan, Bismarck broker, was second in total bidding, paying $96,160 for 22 tracts.

Waste Rules Studied

DENVER.—The Colorado Oil and Gas Conservation Commission plans to make definite regulations concerning waste in Denver-Julesburg basin oil and gas pools.

The commission is currently making a study of oil and gas production in northeastern Colorado. A hearing will be scheduled to discuss the issue, an important one to flush oil production in areas of high gas-oil ratio.

The commission was sustained last year in regulations establishing a maximum gas production of 150 M.c.f. of gas per day per well with oil production from the Weber sand in Rangely field.

In January the commission heard considerable discussion concerning limiting gas-oil ratios on wells in Morgan County's Adams field to 5,000 M.c.f. per barrel of crude in cases where gas was flared. Spacing for gas wells in the field was established at one well for each 160 acres, with 40-acre spacing for oil wells at this hearing. Fields included in the Adena producing area are West Fork, North Adena and Glenn Ranch.

Temporary Spacing Granted

BISMARCK, N. D.—The North Dakota Industrial Commission has granted Stanolind Oil & Gas Co.'s request for temporary 160-acre well spacing in the new West Sanish pool in McKenzie County.

The pool is a basal Mississippian producer and the discovery well, the 1 Star, is North Dakota's deepest producer.

The commission also granted temporary 80-acre spacing patterns for Fryburg field in Billings County and South Beaver field in Williams County. The order will be in effect for 18 months and then hearings will be held to determine permanent spacing.

Establishment of a spacing pattern for the Devonian pool in Beaver Lodge field was deferred until a well is completed in that formation.

Spring Cuts Imports

Drop of 120,000 bbl. daily in total imports predicted by May when crude imports to West Coast will increase

TOTAL imports will follow a normal seasonal pattern and decrease almost 120,000 bbl. daily between January and May, according to reports filed with the Texas Railroad Commission by companies making nominations for crude purchases in February.

The total of crude imports by the reporting companies was estimated at 617,100 bbl. daily for January. The April total is expected to be about on the January level, but an increase forecast for May raises the projected total for that month to 643,300 bbl. daily. Most of this increase is indicated for the West Coast.

The increase in crude imports will be more than offset by a seasonal reduction in products, mostly heavy fuel. Total product imports for the reporting companies amounted to about 463,500 bbl. daily, including 61,400 bbl. daily of bonded oil, most of which enters duty free for bunkering ships in foreign trade. The product total is expected to decrease to 355,000 bbl. daily for April and to 320,400 bbl. daily in May.

Since some companies do not report to the Texas Railroad Commission, the above totals will be slightly less than the final figures reported by the Department of Commerce. The October total, reported to the Texas Railroad Commission, was 905,700 bbl. daily compared with 965,600 from the monthly compilation of the Department of Commerce. The difference was slightly less in November with 1,019,500 bbl. daily reported to the Railroad Commission and 1,600,100 bbl. daily from the Department of Commerce.

FORECAST OF IMPORTS*

(Thousands of barrels daily)

	January 1954	April 1954	May 1954
CRUDE—EAST COAST			
Atlantic Refining Co.	64.8	64.8	64.8
Cities Service Co.	2.4	5.7	8.7
Eastern States Pet. Co.	1.0		
Gulf Oil Corp.	94.0	105.0	111.0
Phillips Petroleum Co.	6.5	6.6	6.5
Sinclair Oil Corp.	66.0	66.0	66.0
Socony-Vacuum Oil Co.	89.0	89.0	89.0
Standard Oil Co. of Calif.	71.7	71.7	71.7
Standard Oil Co. (Ind.)	15.8	14.0	16.0
Standard Oil Co., (N. J.)†	81.0	81.0	81.0
Sun Oil Co.	22.3	11.7	14.5
The Texas Co.	63.2	40.0	53.0
Total East Coast	577.7	555.5	582.2
CRUDE—WEST COAST			
Standard Oil Co. of Calif.	33.9	33.9	33.9
Tidewater Assoc. Oil Co.		12.5	12.2
The Texas Co.	5.5	15.0	15.0
Total West Coast	39.4	61.4	61.1
Total U. S.	617.1	616.9	643.3
PRODUCTS—			
Asiatic Petroleum Corp.	1.1	9.3	1.0
Eastern States Pet. Co.	21.0	21.0	21.0
Gulf Oil Corp.	12.0	14.0	14.0
Shell Caribbean Pet. Co.‡	175.0	105.0	80.0
Shell Oil Co.	14.0	16.3	15.8
Socony-Vacuum Oil Co.	10.4	10.4	10.4
Standard Oil Co. (Ind.)	28.0	20.5	19.8
Standard Oil Co. (N. J.)§	195.0	150.0	150.0
The Texas Co.	7.0	8.5	8.4
Total products	463.5	355.0	320.4
Total crude and products	1,080.6	971.9	963.7
Bonded oil included¶	61.4	68.0	59.7

*From company reports to the Texas Railroad Commission. †Based on quarterly estimates. ‡Imported by independent distributors. §Received through suppliers who can furnish either domestic or foreign oil. ¶Mostly duty free for bunkering ships in foreign trade.

Resid Imports Jump

November imports of crude continue downward trend

SEASONAL increases in imports of residual fuel in November raised total receipts for the month to 1,060,000 bbl. daily, the highest level since last March, according to data compiled and released by the Census Bureau of the Department of Commerce.

Crude imports averaged 597,000 bbl. daily for the month, down 22,000 bbl. daily from October and off 132,000 bbl. daily from the all-time record set in September.

Compared with the September record, less crude came in from all supplying countries with the exceptions of Mexico and Qatar. No receipts were reported from Qatar in September, and imports of Mexican crude were below normal for that month.

Imports of Venezuelan crude decreased 81,000 bbl. daily, compared with September, but part of this loss was made up in increased imports of residual, most of which was made from Venezuelan crude. Crude from

IMPORTS INTO CONTINENTAL UNITED STATES

(Thousands of barrels)

	Nov. 1953	Oct. 1953	Nov.† 1952
Crude—			
Mexico	180	379	616
Colombia	1,066	1,337	1,121
Venezuela	9,027	9,807	9,609
Ecuador		90	
Kuwait	3,213	3,050	1,907
Saudi Arabia	2,445	2,363	2,696
Iraq	103	92	
Qatar	527	700	
Canada	183	342	98
Far East	1,175	1,030	776
Total crude	17,919	19,190	16,823
Daily average	597	619	561
Products—			
Residual fuel	12,997	10,286	10,436
Other products	887	457	402
Total products	13,884	10,743	10,838
Daily average	463	347	361
Total all oils	31,803	29,933	27,661
Daily average	1,060	966	922

EXPORTS*

	Nov. 1953	Oct. 1953	Nov.† 1952
Crude	1,052	1,178	1,805
Gasoline	2,604	2,000	3,442
Kerosine	489	324	357
Distillate	2,150	2,375	2,953
Residual	1,912	†2,220	1,271
Lube oils	1,175	1,197	961
Other products	625	779	834
Total all oils	10,007	10,073	11,623
Daily average	334	325	387

*Excludes shipments to territories. †Revised.

the Middle East dropped 32,900 bbl. daily from the September average.

Crude imports of the West Coast averaged 77,000 bbl. daily in November compared with 80,500 bbl. daily in October and 112,000 bbl. daily in September.

Residual imports follow the seasonal trend of heavy fuel demand with low averages during the summer months followed by increases during the heating season. The average for November was 433,200 bbl. daily compared with 331,800 bbl. daily in October and 347,900 bbl. daily in November 1952. The big increase over the previous year was due to the fact that the winter-season jump that year did not come until December.

Exports of crude and products average 334,000 bbl. daily in November excluding shipments to territories. Compared with October, small increases were reported for gasoline, kerosine and lube oils. Crude, distillate, residual, and other minor products were a little under October averages.

CANADA

Search Deal Closed

Texas company undertakes vast Canadian exploration

CALGARY, Alta. — An agreement has been made for the exploration of 4,000,000 gross acres of undeveloped properties in the Peace River area in British Columbia and Alberta and in the Alberta foothills and plains areas.

Canadian Atlantic Oil Co., Ltd., signed the agreement with Southern Production Co., Inc., of Fort Worth, Tex., which will spend a minimum of $5,000,000 on the exploration between January 1, 1954, and June 30, 1955.

Other companies, with property interests included are Pacific Petroleums, Ltd., and Peace River Natural Gas Co., Ltd. both of Calgary, and Sunray Oil Corp. of Tulsa, Okla.

Under the agreement, the net acreage in which Southern Production can earn a half interest amounts to 3,500,000 acres.

Southern Production will be reimbursed for exploratory costs on each of 28 projects into which the property has been divided, out of the first production from each project. Development expense will be shared on the basis of working interests.

Southern Production has the option of extending the agreement to June 30, 1956, by spending an additional $3,000,000 on exploratory work, and of additional 1-year extensions thereafter by the expenditure of $2,000,000 in each such year.

This is Southern Production's first participation in the more extensive oil and gas picture in Alberta and British Columbia. Previously the company had limited its activities to a 20 per cent interest in 1,400,000 acres in Saskatchewan, under which substantial reserves of medium gravity crude already have been discovered.

Acreage included in the new agreement contains some currently dedicated to Westcoast Transmission Co., Ltd., which has an application before the Federal Power Commission for construction of a natural-gas pipe line into the United States.

Capital Boost Sought

OTTAWA, Ont.—Trans-Canada Pipe Lines, Ltd., one of the two companies that will build a natural-gas line eastward from Alberta's gas fields, has asked Parliament to allow an increase in its capitalization from $5 million to $60 million.

Trans-Canada has asked permission to increase its voting stock from $5 to $10 million and in addition issue a million shares of preferred nonvoting stock at $50 a share.

Trans-Canada and Western Pipe Lines, Ltd., will build the 2,240-mile gas line. The two companies were brought together early in January in a series of meetings with Trade Minister Howe.

The bill before Parliament for the capitalization increase of Trans-Canada is understood to be a preliminary step toward the merger of Trans-Canada and Western under the name of the former.

Union Gas Plans Line

CHATHAM, Ont.—Plans are under consideration by Union Gas Co. of Canada, Ltd., for a 180-mile natural-gas transmission line from the Dawn storage field in Lambton County to the Hamilton area, and extending to a point 6 miles east of Oakville.

The line would supply gas to the Dominion Natural Gas Co., and also to Central Pipe Line Co., which serves the Aylmer district.

Saskatchewan Has Good Year

REGINA, Sask. — Nearly $52,000,000 was spent on oil exploration and development in Saskatchewan last year as 800 wells were drilled and production more than doubled.

The mineral resources department reported the 800 wells as compared to 447 in 1952 and estimated production at 2,610,000 bbl. compared to about 1,000,000 bbl. in 1952.

El Paso Line Construction is Air Conscious

This landing strip furnishes convenient access to the construction site of the Midkiff gas booster plant for the new pipe line of El Paso Natural Gas Co. in the Spraberry area of West Texas. Shown here is the plane of El Paso Natural's supervisor. The rig in the background is drilling one of five gas storage wells planned for the plant site.

Report Dodges Imports

Randall Commission recommendations face uphill battle as congressional leaders file lengthy minority report

WASHINGTON.—The oil industry's problem of imports and quotas was still unanswered last week after submission to President Eisenhower of an international trade program worked out by the Randall Commission on Foreign Economic Policy.

These questions were largely dodged in the commission's report, much less strongly free trade than had been expected but still definitely unsatisfactory to members of Congress who will have much to say about the foreign trade policy to be enacted this year.

Specifically, Sen. Eugene D. Millikin of Colorado, chairman of the Senate Finance Committee; Rep. Daniel A. Reed, chairman of the House ways and means committee, and Rep. Richard M. Simpson of Pennsylvania, second ranking majority member of the latter, were strongly critical of the commission's findings and recommendations as going too far in the direction of free trade. On the other hand, David J. McDonald, president of the CIO United Steel Workers of America, was equally bitter over the commission's failure to go far enough in that direction.

The commission report failed to discuss specifically the problems of the domestic oil, coal and other basic industries. Recommendations which might have a bearing on those problems were largely in the field of improving conditions for the investment of American capital abroad.

Dissent is critical . . . These sections of the report drew criticism from Reed and Simpson in a strong dissent in which they charged Chairman Clarence B. Randall with railroading the report through, pointing out the commission had until March 6 in which to file but the report "was frozen and submitted to the members of the commission with only 1 week allowed for development of their dissents."

Millikin was even more outspoken in his criticism, declaring that the commission's recommendations, if put into effect, "would dangerously increase our dependence on foreign sources for needed strategic and critical war materials."

"It would seem that the experiences of two world wars would sufficiently argue the point that our main dependence should rest wherever possible upon domestically produced materials," the senator asserted.

"The notion that we can conserve our domestic materials for emergency use while increasing our dependence upon foreign sources is fallacious."

In Congress, the commission report was seen as representing the maximum administration program for liberalization of the Reciprocal Trade Act. It was freely predicted it goes much further than Congress will be willing to follow.

Lengthy minority report . . . This view was borne out by a lengthy minority report later filed by Reed and Simpson in which they declared the Reciprocal Trade Act, if extended at all, should be continued for not more than 2 years while the Tariff Commission makes an "industry by industry, and product line by product line" review of the tariff structure "as a new base from which our foreign economic policy could be developed."

The two congressmen referred specifically to the "public service" industries which are basic to the entire economy in both peace and war, declaring "any sound policy should consider the necessity of insuring that their operation is not dependent upon any foreign sources of supply of equipment or maintenance which cannot be depended upon in an emergency." This, they said, would apply to the gas, power, transportation and communications industries.

The question of raw materials, however, poses a special problem.

"It is important that foreign raw materials have easy access to the country," it was conceded. "On the other hand, it is essential for the safety and security of the country that domestic sources be not permitted to die even though their costs may be comparatively high.

Minority has no answer . . . "We do not purport to have the answer to the problem," the minority report said, "but recommend that special studies, commodity by commodity, be made by an appropriate agency chosen by Congress with a view to providing a better and sounder answer than has been forthcoming to date."

The two congressmen concurred in many of the majority's recommendations for the encouragement of American investment abroad, but in that connection contended that economic stability of other countries could be furthered by return to the international gold standard which only Switzerland now observes.

More immediately needed, however, the minority report insisted, is broader tariff adjustment for those domestic industries which have laid off employes or are threatened with layoffs because of the competition of foreign imports.

Commission recommendations . . . Some of the commission's recommendations, specifically on encouragement of foreign investment, already have been incorporated in the President's budget message. Others are expected to be included in a special message he will send to Congress later in the session.

Here are a few of the commission's recommendations which are of interest to the oil industry:

. . . Full diplomatic support of the government in promoting conditions abroad conducive to private foreign investment.

. . . Restatement of U. S. antitrust policies to clearly acknowledge the right of each country to regulate trade within its own borders, but at the same time it should be made clear that foreign laws encouraging restrictive price, production or marketing arrangements will limit willingness of U. S. businessmen to invest abroad.

. . . A reduction of at least 14 per cent on the corporate tax rate on income from foreign investments with allowances for foreign taxes against income for domestic taxation (included in the President's budget message).

. . . No penalties on investors under U. S. tax laws for adopting the form of organization dictated by local laws or business conditions abroad.

"The most effective contribution which the U. S. Government can make to the development of foreign sources of raw materials in which we and the free nations generally are deficient is to follow policies favorable toward private investment abroad."

. . . Tariff determination on economic grounds. Upon a finding by the President that it is necessary on solely military grounds to assure a strictly domestic source of supply, the purpose should be accomplished by other means

and the cost borne by the defense budget.

. . . Extension of President's power to negotiate trade agreements for not less than 3 years in which time he should be authorized to reduce existing tariff rates by not more than 5 per cent of present rates each year.

. . . Retention of the escape clause and peril point provisions of the present law with the President authorized to disregard the finding of the Tariff Commission "whenever he finds that the national interest of the United States requires it."

While Millikin, Reed and Simpson were most outspoken in their criticism, Senators Bourke B. Hickenlooper of Iowa and Walter F. George and Harry F. Byrd of Virginia also filed dissents on various points.

The report was approved by a 10-to-7 split with five of the six industrialist members, one of five senators and three of five congressmen going along with Chairman Randall.

Line Reports Due

Gas executives expected to turn down defense line

WASHINGTON.—Seven gas industry executives studying the possibility of a natural-gas defense pipe line from the Texas Gulf to the East Coast probably will make their report to the Petroleum Administration for Defense within the next few days.

The panel of consultants is expected to say construction of the line is not necessarily feasible at this time — at least without considerably more government assistance than has so far been suggested. They probably will back this view with the two major obstacles in the way of the project. They are:

. . . High cost of the line in light of the possible difficulty in securing a gas supply at low cost.

. . . Operation restrictions on the line which would have to be operated on an interruptible basis so it could be immediately converted to crude oil in the event of an emergency.

What happens then? . . . If the gas industry follows the lead of the oil industry in turning down the idea of the pipe line, PAD is expected to turn its attention to the next alternative on its list—the idea of planning and stockpiling material for a line to be built if and when it is needed.

It is expected also that PAD will submit a report to the Office of Defense Mobilization pointing out the practical problems uncovered in its study of the proposed line. PAD, however, is not expected to recommend that the government finance the line.

WATCHING WASHINGTON

Bertram F. Linz

New Trade Study Starts

A new study of foreign trade started in Washington last week, on the heels of the Randall Foreign Economic Policy Commission report. It is expected to result in considerably different conclusions and recommendations.

The new investigation is being conducted by the Senate banking committee, which has been making preliminary studies through a citizens' advisory committee of some 120 members.

The banking committee does not have final say on foreign trade policy, over which the finance committee has jurisdiction, but gets into the picture through its interest in the Export-Import Bank and measures designed to generate American investment abroad.

It is the Senate finance committee, which in the last analysis will write the Senate's views on foreign trade. Chairman of that committee is Sen. Eugene D. Millikin of Colorado, who differed violently with the views of the Randall commission. In the House, reciprocal trade is in the hands of the ways and means committee, whose chairman, Rep. Daniel A. Reed of New York, and second ranking Republican member Richard M. Simpson of Pennsylvania also disavowed many of the commission's recommendations.

The watered-down recommendations of the commission, much less violently free trade than had been expected in most quarters, is seen as representing the maximum to which the administration will go in further liberalization of foreign trade policies. Even so, it goes much further than Congress is expected to be willing to go, and does not deal specifically with some of the problems which have been laid before Congress including the question of a quota on oil imports, for which Simpson has been fighting.

Research Cut Slightly

The Eisenhower administration has cut government expenditures drastically, but it has taken only a negligible bite out of the funds for scientific research and development.

During the current fiscal year the federal agencies will spend an estimated $2,187,000,000 in this field, only about $18,000,000 less than it spent during the year ended last June 30 and $348,000,000 more than was spent in 1952.

Research and development of the Defense Department will account for three-fourths of the money spent this year, but the Interior Department will spend $33,000,000, a $4,000,000 drop from last year. The cut is largely in the abandonment of the synthetic liquid fuels demonstration program. This year's research by Interior will be at the same level as it was in 1952.

Research by industry also has increased at a tremendous rate and involves the expenditure of several times the amount spent by the government. In fact, the nation's scientific effort has spread so broadly that manpower for scientific investigation has become a major problem.

$1 Billion in Oil Taxes

The Treasury Department expects to collect more than $1,000,000,000 from the four federal oil taxes during the current fiscal year, even with the cut of one-half cent per gallon in the tax on gasoline next April 1.

If Congress accepts the President's recommendation to defer the cut in excise taxes until 1955, the department will collect even more in the coming year. If the tax cuts go into effect, the revenue for fiscal 1955 will be reduced to about $858,000,000, with a $176,000,000 loss foreseen in collections from gasoline and a drop of about $3,500,000 in receipts from diesel fuel.

These taxes account for the greater part of the income derived directly from oil and gas by the federal government. It will retain approximately $4,400,000 this year and $4,800,000 in the coming year from the royalties on oil, gas and other minerals produced in the public lands, not including the outer Continental Shelf.

In addition, the government will get something over $775,000,000 in income taxes from producers, refiners and filling stations. No accurate estimate of this return is available, but in 1950 these three groups paid taxes in the amount of $791,000,000.

ever, is not expected to preclude further consideration of the project if some new ideas can be developed to make it appear more attractive.

The idea of stockpiling for a wartime line is gaining support in some quarters. The obvious advantages of the proposal are:

. . . **It would not upset economic** conditions as would an oil line in the case of tankers and a gas line in the case of the coal industry.

. . . **Lower cost and flexibility of route** are cited as additional advantages. It has been pointed out that if defense needs do not require the line for a number of years some source other than the Gulf Coast might be practical. The Williston basin is already being mentioned in this respect.

The stockpiling idea contemplates drafting of the route, design engineering and purchase and storage of material and equipment that might be in short supply when the line is needed. The right-of-way—on paper—would not be acquired until the line is ready for construction.

PAD officials decline to speculate on their next step—in advance of the report of the industry consultants—but there is a good deal of feeling in the agency that stockpiling might be the most practical way to provide a safe wartime supply line to the East Coast.

Depletion Ruling Soon

House committee tax allowance recommendation expected within the next few weeks; observers foresee no change

WASHINGTON.—Recommendations for the oil industry's depletion allowance in the tax revision bill now being prepared by the House ways and means committee will be disclosed by Chairman Danel A. Reed of New York within the next few weeks.

Possibly before then President Eisenhower will send specific recommendations on this subject to Congress, based on studies which have been under way in the Treasury Department for some months.

Ideas submitted to the committee during its hearings last year or offered to the Treasury show there are four courses which could be taken with respect to percentage depletion on oil, the first extremely unlikely:

. . . **The depletion allowance** could be wiped out, as suggested by the Treasury during the Democratic administration.

. . . **Depletion could be limited** to "cost recovery."

. . . **The 27½ per cent allowance** for oil could be reduced to be more in line with the rates for other extractive industries.

. . . **The formula and rates** for depletion could be left unchanged.

Although some witnesses who testified before the committee last August —particularly from the mining industry—appeared fearful that the depletion benefit would be revoked, Congress in the past has always rejected such suggestions and there has been no development, political or otherwise, which would indicate any change in sentiment.

Cost recovery depletion . . . The idea that depletion should be limited to cost recovery has been advanced from time to time, but it is so complicated that most tax experts have considered it impracticable. Basically, it involves the computation of the volume of production opened up by a well and the cost of developing and producing it, then the setting of a depletion rate which would return that cost over the period of production of the calculated volume.

There have also been suggestions that depletion be limited to the original owner of the well and not pass to the buyer if the well is sold. It has been contended this would not provide the incentive for exploration which Congress sought to give when it adopted the allowance.

It has frequently been argued, however, that the rate on oil should be brought more into line with the rates on other resources, which range from 5 to 15 per cent. There is a possibility that if the Treasury makes any recommendations for changes they will be along that line.

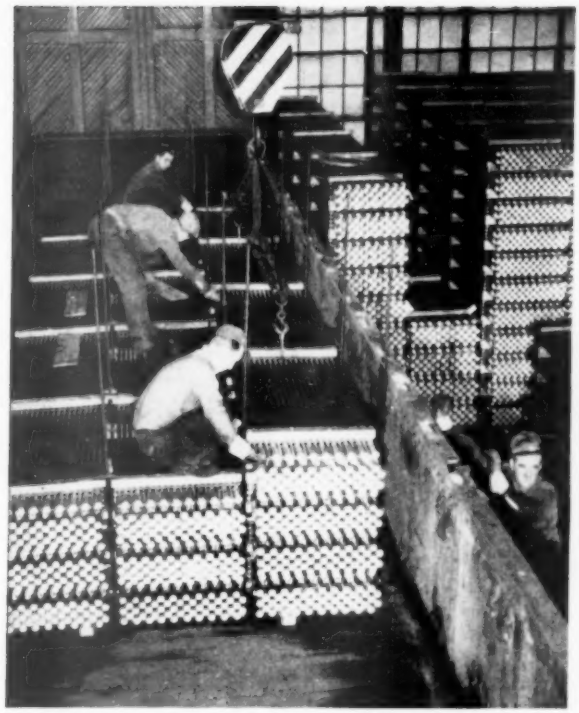
But spokesmen for the oil industry vigorously maintained that no changes whatever should be made in the rate or terms for depletion, and those views are strongly supported by members of Congress from the oil-producing states.

History of allowance . . . The depletion has a long history, dating back to 1909. The Corporation Excise Tax Act adopted in that year permitted the deduction of depreciation, but it made no specific mention of depletion and the Supreme Court held it did not provide any depletion allowance.

The nation's first income tax act, adopted in 1913, provided a depletion allowance of not exceeding 5 per cent for minerals, and although not spe-

Bloomington Field Just a Bit Crowded

This close spacing, five wells on six townsite lots, features Bloomington, Tex., where the field has moved right into the townsite as drillers probe for the 4,600-ft. and 4,900-ft. pay zones. Amerada Petroleum Corp., discoverer of the field and the largest operator, has 80 wells in the field, but has kept its wells on a 20-acre spacing basis. Within the townsite itself, this necessitated unitizing blocks of town lots, but Amerada has drilled no wells on less than 20 acres. The more closely spaced wells have been penalized by smaller allowables because production allowables are based partially on an acreage basis.



Left: Bethlehem Sucker Rods come securely bundled in packages of 80 or 100 rods. Each rod is held in position by spacer grooves, preventing contact with other rods. *Right:* At their destination, Bethlehem rods can be unloaded quickly and easily with a gin-pole truck and lifting rig.

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...because unit load absorbs shock in transit

You needn't be concerned about the condition of sucker rods when they reach your yard—not when you use Bethlehem Sucker Rods. For Bethlehem rods come well bundled in a unit package. The packages form a "floating" load which protects each individual rod by absorbing the shocks encountered in transit. The rods reach you as straight and true as the day they left the plant.

The Bethlehem unit package, containing 80 or 100 rods, is made up of grooved steel spacers. The rods fit snugly in the grooves, where they are prevented from bending or kinking, or making contact with other rods.

Each package is held together by bolts which clamp top and bottom wooden binders. The package is loaded on heavy blocks. Tie-rods and bracing make the load a single, solid unit.

The design and size of the package permit it to be moved quickly and economically by a gin-pole truck and lifting rig, whether the rods are trucked to the job or to storage.

Bethlehem rods come in four types, covering a wide range of pumping conditions. We also produce a complete line of rod accessories. Full details are available from the nearest Bethlehem district sales office or sucker rod distributor. Or write direct to us at Bethlehem, Pa.

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BETHLEHEM *Sucker Rods*

BETHLEHEM STEEL

cifically mentioned oil and gas properties were allowed depletion under that law.

The first specific provision for depletion of oil and gas wells was made in the Revenue Act of 1916, authorizing a deduction based on "actual reduction in flow and production." This was depletion on a "cost recovery" basis, the legislation providing that where the depletion allowance equalled the capital originally invested, or the fair market value on March 1, 1913, no further allowance was to be made.

The cost recovery basis proved unworkable as originally written, and the formula was modified in the 1918 act and again in the 1921 and 1924 acts. In the 1926 act the discovery value was replaced by a flat allowance of 27½ per cent of the gross income from the property, limited to an amount not in excess of 50 per cent of the net income from the property, a formula that has proved so satisfactory that no changes have since been made.

Shelf Rules Nearly Ready

WASHINGTON. — Regulations for the leasing of oil and gas lands in the outer Continental Shelf are expected to be issued by the Interior Department about the middle of this month.

The industry, however, will be given an opportunity to criticize them and suggest changes before they go into effect.

Department lawyers have been working on the regulations for a number of months and they are now about ready for final approval.

Officials anticipate that publication of the rules will result in considerable activity beyond state boundaries in the Gulf of Mexico almost immediately (see Gulf Coast), and they were written with a view to encouraging operators and keeping to a minimum the regulatory difficulties involved in activities in navigable waters.

FPC Renews Writeoff Rule

WASHINGTON.—The Federal Power Commission last week refused to review the policy adopted in December that certificates of accelerated amortization secured by natural-gas companies for new facilities would not be considered in the setting of rates. *(The Oil and Gas Journal, December 14, page 93.)*

The commission stated its position in denying a petition filed by the cities of Covington and Newport, Ky., which are involved in a rate wrangle with the Cincinnati Gas & Electric Co.

While agreeing with the position taken by the majority on the issue of reconsideration, Commissioner Dale E. Doty, who dissented from the December policy order, again assailed the commission's policy. He charged, in this instance, the two cities will be required to pay the company "currently large amounts labeled income taxes but which Cincinnati will not be required to pay to the federal Government for a great many years in the future, if at all."

Tax Amendment Approved

WASHINGTON.—The House ways and means committee approved an amendment to the tax laws last week designed to benefit nonindustry taxpayers who invest in oil properties.

The committee adopted an amendment to the so-called "hobby" loss provisions which require that where a taxpayer has losses from a business of more than $50,000 for each of 5 consecutive years he must recompute his tax for each year, ignoring that part of the loss in excess of $50,000.

The proposed amendment provides that in determining whether he has losses in excess of $50,000 from the business the taxpayer, in addition to ignoring his deductions for taxes and interest as present provided, is also to ignore casualty or abandonment losses and expenditures which he has the option to deduct or capitalize, as in the case of drilling operations.

The effect of the amendment would be to ignore losses in mineral exploration in determining whether a loss from a business falls within the category of a "hobby" loss.

Land-Law Amendment Sought

WASHINGTON. — Homesteaders and others securing patents to public lands under the nonmineral land laws would receive the mineral rights as well as the surface under legislation passed by the House of Representatives January 18.

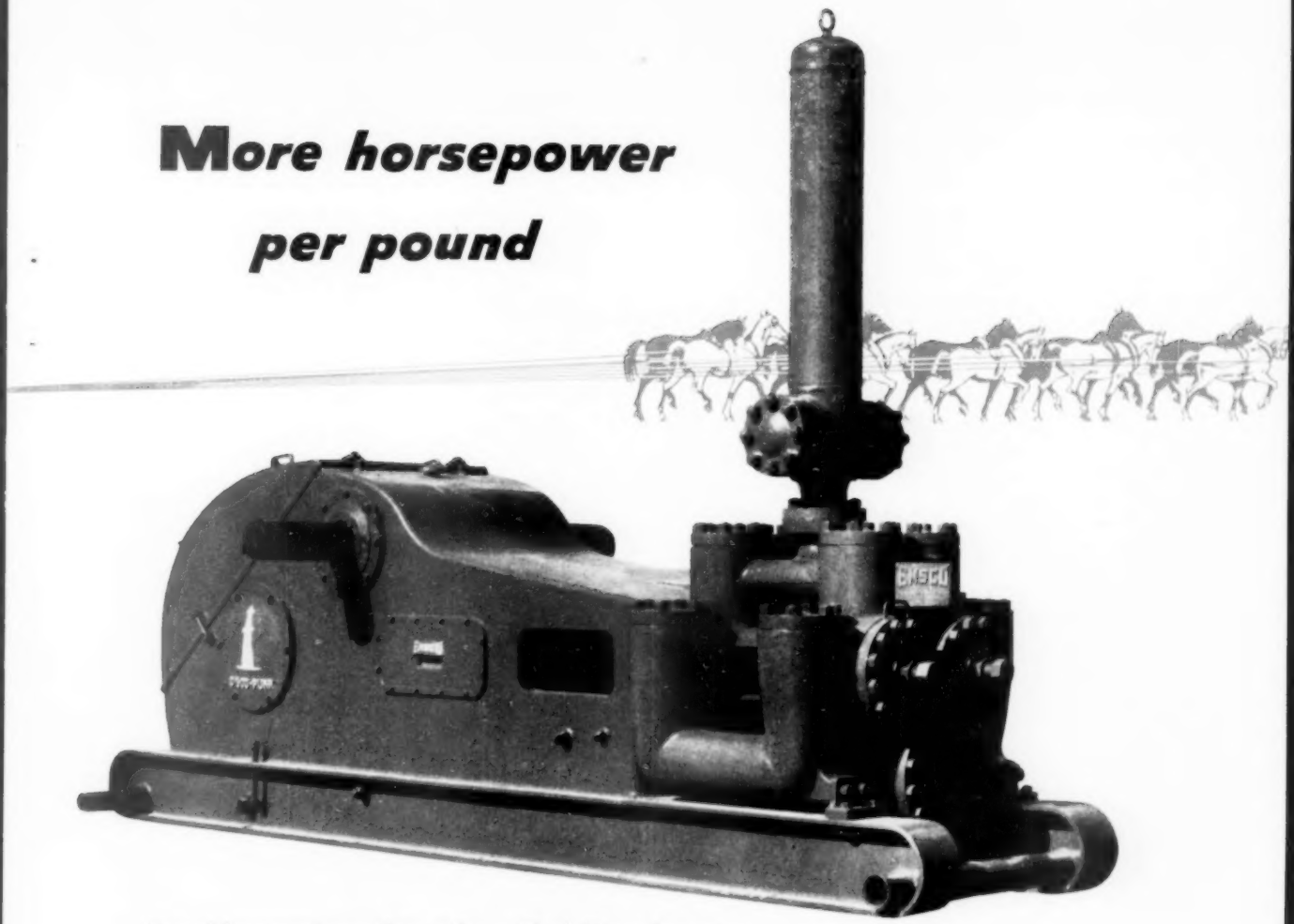
The bill, which now goes to the Senate for concurrence, amends an act of July 17, 1914, providing for agricultural entry of lands withdrawn, classified or reported as containing oil, gas or certain other resources.

It strikes out a provision reserving the subsurface deposits to the United States and substitutes a provision that patents shall not contain a reservation of any mineral deposits other than those of fissionable materials, even though the patentee has consented to the reservation of other deposits.

New Sinclair Cracker One of Nation's Biggest

One of the biggest new catalytic crackers in the United States is this fluid unit at Sinclair Refining Co.'s Houston plant. The cracker was designed by Sinclair refining engineers to charge 40,000 bbl. of fresh feed and to recycle 10,000 bbl. of stock daily. Design production is 15,300 bbl. of light gasoline, 6,300 bbl. of butane-butylenes, 2,250 bbl. of propane-propylenes, 1,750 bbl. of heavy gasoline for reforming stock, 4,400 bbl. of light gas oil, 6,000 bbl. of heavy gas oil, and 1,200 bbl. of clarified oil from the 40,000 bbl. of virgin gas-oil charge stock. Gas-recovery unit is in lower foreground. An engineering article with full details on design and operation of the new cracker will appear in the engineering section next week.

More horsepower per pound



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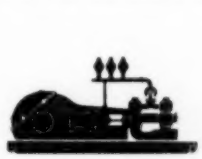
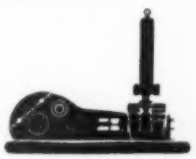
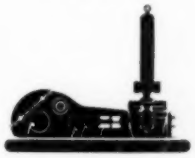


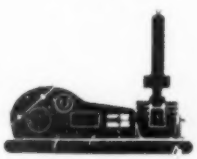
D-850: Hp. input 850 @ 60 rpm.



D-500: Hp. input 500 @ 65 rpm.



D-300: Hp. input 300 @ 70 rpm.



D-175: Hp. input 175 @ 75 rpm.

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WEST COAST

Union Buys Coke Plant Site

LOS ANGELES. — Union Oil Co. has purchased 3,250 acres of ocean-front land 12 miles northwest of Santa Maria as a site for a coking plant in which preliminary processing of Santa Maria crudes will be carried out.

The company has had the acreage under option since last August pending determination of an adequate water supply and other requirements. The site is due west of Nipomo in San Luis Obispo County.

The coking plant will be part of a $40,000,000 refinery expansion program designed to enable Union to obtain a greater yield of gasoline and to produce higher octane gasoline. Capacity of the plant has been set at 20,000 bbl. daily but the type process to be employed has not yet been announced. Reports in the industry are that it will be of the conventional delayed type.

Distillates obtained from the coker will be tankered to the company's Oleum refinery. There the high-sulfur products will be processed in a 15,750-bbl. Unifining unit, the first commercial application of the company's cobalt molybdate process. The upgraded product then will be charged to a 14,600-bbl. Platformer. Both plants are being constructed by C. F. Braun & Co. and are scheduled for completion late this year.

Unitization Power Granted

LONG BEACH.—Long Beach voters in a special election here have decided by a margin of more than 3 to 1 to:

... **Require competitive bidding** on all contracts pertaining to development of the city's oil lands.

... **Outlaw community oil leases** which include tidelands areas.

... **Permit unitization programs** designed to increase oil recovery and check subsidence.

The green light on unitization will permit Long Beach Harbor Department engineers to proceed with their studies as to the feasibility of a large-scale water-injection program in the Harbor area of Wilmington field. A trial flood now under way in a small Terminal zone subpool is giving indications that flooding may prove profitable.

Of six other propositions voted on, two failed to pass. One was a controversial oil development issue, rejected 5 to 1. Opposition to the proposition was based on the argument that the city has no plan for financing offshore oil development and exploration, and that the amount of money needed was not specified in the amendment. Defeat of the issue also denied the city council use of tidelands oil money for the maintenance and operations of improvements constructed on the tidelands.

Leasing Race Heats Up

LONG BEACH. — The owners of some 1,800 separate pieces of residential and business property in a 500 to 600-acre triangular tract facing Long Beach's tidelands acreage are being besieged with lease offers.

One firm of brokers says it has already leased more than 300 parcels of the land for $250 an acre a year and 25 per cent royalty. On the other hand, the president of a property owners' association says flatly that a major oil company has offered $250 an acre and 50 per cent royalty and his group is holding out for more.

R. A. Keans, of Keans, Springmann & Stipek, Inc., says he has leased 300 pieces of property in the area eastward from Pine Avenue to Temple and Ocean Boulevard. Dr. Russell M. Brougher, president of the Property Owners Oil Development Association, says some offers made his group exceed the 50 per cent royalty figure, plus the annual rental.

MID-CONTINENT

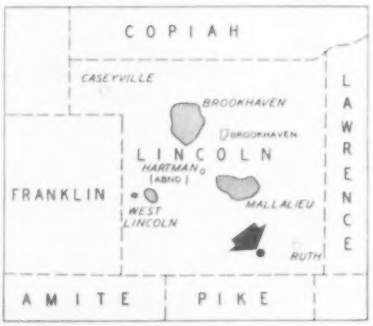
Oklahoma Allowable Set

OKLAHOMA CITY. — The Oklahoma Corporation Commission last week left the state's February-March allowable unchanged from January, and at the same time took the first step toward revising Oklahoma's proration setup.

The commission action means a production of between 515,000 and 530,000 bbl. a day during February. The allowable was based on the recommendation of Conservation Director Walker Pound that the February-March producing rate be set at 60 per cent of last August's per-well allowables. This same formula has been in use since October.

In another action, the commission gave the conservation department authority to make a detailed survey of state oil fields, obtaining names of leases, pools, and operators; information on the number and location of all producing wells, their capacity, depth, and producing formation; and information on secondary-recovery operations.

SOUTHEAST



LOWER TUSCALOOSA oil fields and known salt domes (shown by circles) in Lincoln County, southern Mississippi. Arrow indicates new deep oil discovery by A. O. Phillips.

Mississippi Strike

Rank wildcat is indicated lower Tuscaloosa producer

BROOKHAVEN, Miss.—The first oil discovery in the deeper portion of the Mississippi embayment in several years in virtually assured by results of initial production tests in a rank wildcat 15 miles southeast of here in southern Lincoln County, southern Mississippi.

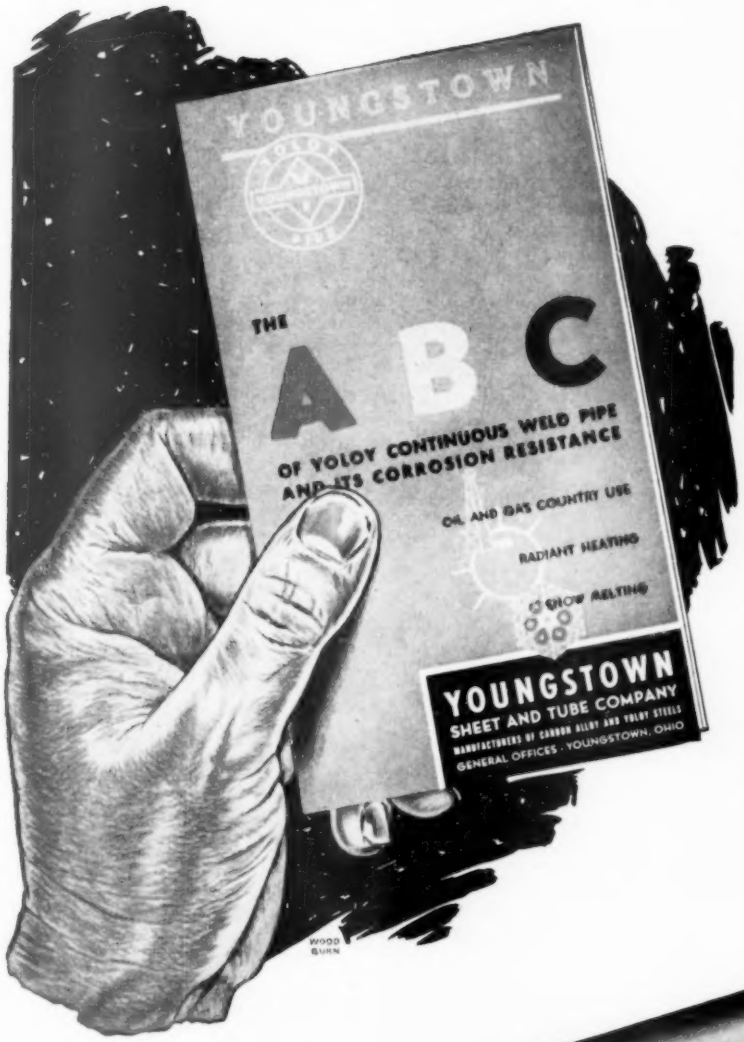
The wildcat, 1 Rollins (arrow on map) drilled by A. O. Phillips, is being completed following a 6-hour preliminary drill-stem test of perforations at 10,785-91 ft., opposite a lower Tuscaloosa sand.

During this test, through ¼-in. bottom and 10/64-in. top chokes, the well flowed 100 bbl. of oil, or at the rate of 400 bbl. per day, with top pressure of 1,175 psi. Bottom-hole flowing pressure ranged from 2,502 to 4,749 psi. Gravity of the oil was estimated at between 35° and 40°.

Before running casing through the pay zone, the hole had been drilled to 10,953 ft. with bottom in the Lower Cretaceous formation, topped at 10,944 ft. (subsea 10,530 ft.). Top of the Upper Cretaceous-lower Tuscaloosa, in which the pay sand was found, was logged at 10,656 ft. Casing was run to 10,860 ft.

Lower Tuscaloosa sands are, or have been productive in four other Lincoln County fields. Two of these, Brookhaven, discovered in 1943, and Mallalieu, discovered in 1944, are among Mississippi's most important productive areas.

This DATA may solve YOUR piping problem



● Here is the up-to-date story of Yoloy Continuous Weld Pipe—a remarkable low alloy steel whose nickel-copper content gives it unique ability to withstand corrosion, abrasion and shock. These outstanding advantages combined with high strength, ductility and weldability make Yoloy Pipe an excellent selection.

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This new folder presents the facts and figures on Yoloy's physical and chemical properties, with data on sizes now available and other information you'll need to select Yoloy Continuous Weld Pipe to meet your special requirements. Write for a copy today.

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World Output Lagging

Free World output drops 58,000 bbl. daily as increases in U. S., Venezuela fail to offset Middle East decline

Dahl M. Duff

SHARP cuts in production in the Middle East caused total Free World crude output to decline some 58,000 bbl. daily in November.

The drop in the Free World total continued the trend which began last July. The November decrease was the fourth successive monthly decline following a steady rise which took place from February through July.

Free World production averaged 11,714,600 bbl. daily in November, off 58,400 bbl. daily, or 0.5 per cent, from the previous month. The November total was the lowest since last April and compared with an average of 11,816,000 bbl. daily for the first 11 months.

Production in the Western Hemisphere gained during the month as a result of a large increase in Venezuelan output and a smaller rise in the United States. However, these increases were more than offset by declines in nearly all the producing countries of the Middle East.

Non-Communist foreign production was off 74,100 bbl. daily, or 1.3 per cent. The total of 5,437,400 bbl. daily was, however, 335,100 bbl. daily or 6.6 per cent above November 1952. United States production showed only a minor increase of 15,700 bbl. daily over October. As compared to November 1952, United States output was off 183,900 bbl. daily, or 2.8 per cent.

Of the four month-to-month drops in total Free World production that have occurred since last July, three, in August, September, and November, have been due to decreased output in fields outside the United States. The decline in October was the result of a sharp cutback in the United States.

Kuwait drop shows . . . Middle East production in November was off 186,600 bbl. daily, or 7.4 per cent, to an average of 2,341,500 bbl. daily, its lowest level since last March. The 11-months average in the Middle East amounted to 2,415,700 bbl. daily, and the November production, though sharply down from October, was still 166,700 bbl. daily, or 7.7 per cent, above November 1952. Production in the Middle East rose each month from December through July but has fallen since with the exception of October.

The principal decrease in the Middle East in November occurred in Kuwait which was down 123,500 bbl. daily, or 13.0 per cent, from the record high level of 950,300 bbl. daily established in October. Kuwait's average for the 11 months amounted to 854,000 bbl. daily.

Other production declines in the Middle East in November occurred in Saudi Arabia, Iraq, and Iran. Saudi Arabia, second leading producing country in the region, was down 39,900 bbl. daily from the October total. Production in Qatar showed a further decrease of 15,100 bbl. daily to 69,100 bbl. daily, the lowest in this shaikhdom since September 1952.

Iraq's output was off only slightly with a drop of 2,200 bbl. daily to 580,200 bbl. daily. Both Zubair and Kirkuk fields showed minor decreases. Iranian production shown is net output as reported by the National Iranian Oil Co. In November, gross production, including material recycled, averaged 51,900 bbl. daily as against 54,900 bbl. daily the previous month.

Venezuela on increase . . . The rise in

TREND OVER THE LAST YEAR

	W. Hemisphere less U. S.	Middle East	Total non-Communist foreign
1952—			
December	2,561.3	2,092.1	5,075.0
1953—			
January	2,472.8	2,252.3	5,152.2
February	2,407.2	2,258.4	5,096.8
March	2,412.5	2,266.1	5,104.8
April	2,448.1	2,426.8	5,306.6
May	2,423.1	2,523.7	5,391.0
June	2,459.4	2,536.0	5,450.1
July	2,487.7	2,534.0	5,471.9
August	2,443.3	2,489.0	5,387.3
September	2,485.7	2,416.4	5,345.3
October	2,519.5	2,528.1	5,511.5
November	2,641.7	2,341.5	5,437.4

CRUDE-OIL PRODUCTION
(Daily average in thousands of barrels)

Country—	Nov. 1953	Oct. 1953	Nov. 1952
W. Hemisphere:			
Argentina	77.0	76.2	72.0
Bolivia	2.6	1.8	1.3
Brazil	2.2	2.6	2.2
Canada	259.0	227.0	185.8
Chile	4.6	4.5	2.8
Colombia	108.2	109.0	103.4
Cuba	0.1	0.1	0.1
Ecuador	8.1	8.1	7.9
Mexico	205.0	200.0	211.0
Peru	41.8	42.0	45.2
Trinidad	62.0	62.4	58.5
Venezuela	1,871.1	1,785.8	1,814.5
Total	2,641.7	2,519.5	2,504.7
Europe & Africa:			
Algeria	1.5	1.5	1.2
France	7.4	7.3	6.8
Fr. Morocco	2.2	2.2	1.9
W. Germany	45.0	45.4	36.8
Italy	1.9	1.8	1.8
Netherlands	17.1	17.4	13.0
Egypt	45.0	44.8	46.5
United Kingdom	1.1	1.1	1.1
Total	121.2	121.5	109.1
Middle East:			
Bahrain	30.1	30.0	30.2
Iran	23.1	29.0	23.0
Iraq	580.2	582.4	485.3
Kuwait	826.8	950.3	792.4
Qatar	69.1	84.2	79.4
Saudi Arabia	811.8	851.7	764.2
Turkey	0.4	0.5	0.3
Total	2,341.5	2,528.1	2,174.8
Other Asia:			
British Borneo	103.0	103.5	104.3
Burma	3.4	3.4	2.5
India	6.8	6.6	6.0
Indonesia	205.0	214.0	186.7
Japan	6.0	6.0	5.7
New Guinea	4.8	4.8	4.7
Pakistan	4.0	4.1	3.8
Total	333.0	342.4	313.7
Total, Non-Communist, foreign	5,437.4	5,511.5	5,102.3
United States	6,277.2	6,261.5	6,461.1
Total Free World	11,714.6	11,773.0	11,563.4
Est. Russia and E. Europe:			
Austria	62.0	62.0	55.0
Romania	100.0	100.0	80.0
Russia	1,060.0	1,060.0	985.0
Other Communist	34.7	34.7	25.1
Total	1,256.7	1,256.7	1,145.1
World Total	12,971.3	13,029.7	12,708.5

Figures are from reliable reports in the industry or official government sources. Data for Russia and Eastern Europe are based on competent estimates; no authentic information is available on month-to-month production in these regions. Estimates also have been made for certain other countries, particularly in Southeast Asia, for which completely current reports are lacking. Iranian production shown is net output, not including recycled material. Other Communist includes China and Yugoslavia as well as the Soviet satellite countries in Europe.

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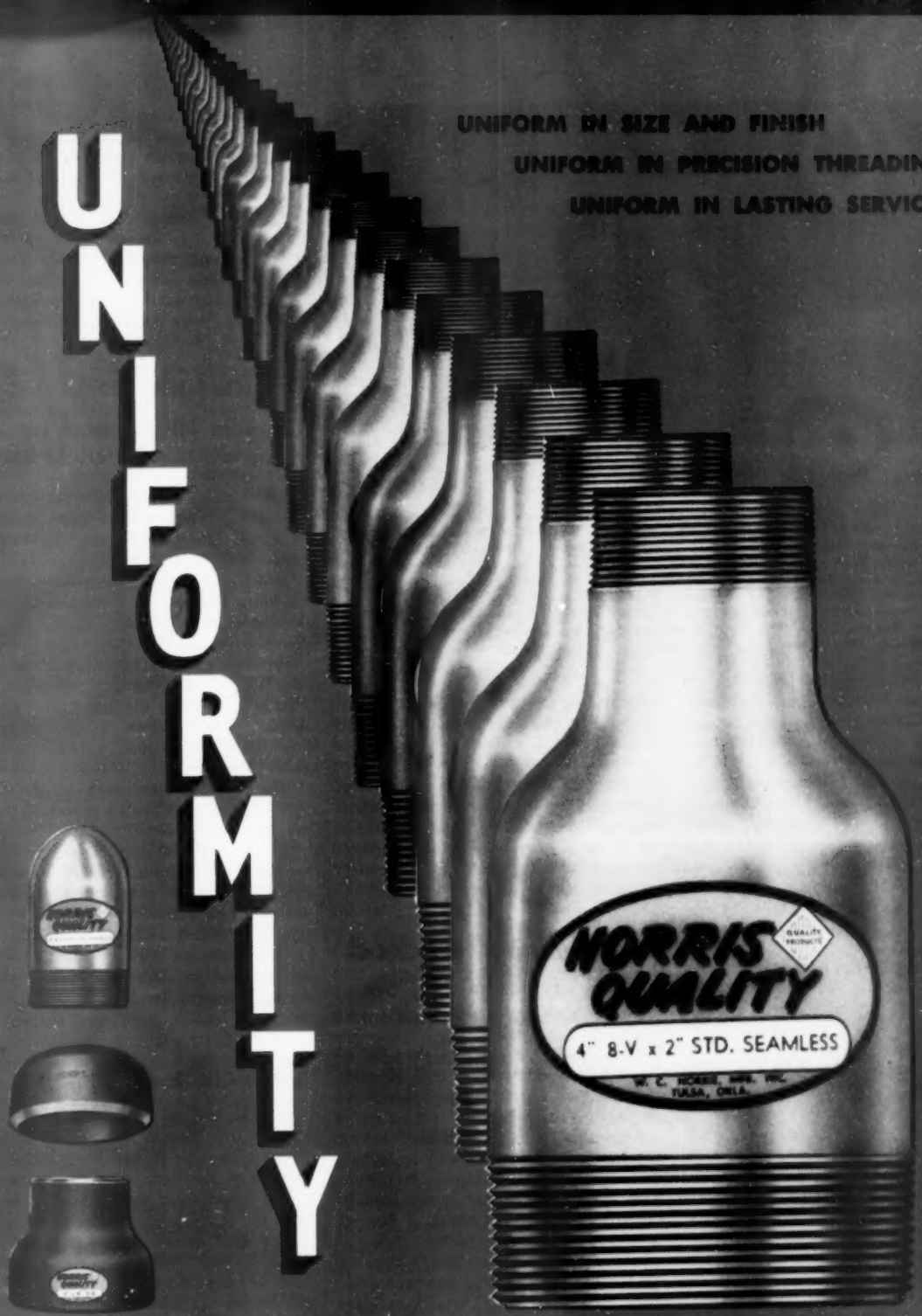

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Los Angeles Nomads Name New Officers

Members of the Los Angeles chapter of Nomads elected new officers for 1954 at their annual business meeting recently. Incoming and outgoing officers are, left to right: (seated) Harry Hester, McCullough Tool Co., secretary; Joe Schlarb, Chiksan Co., vice president; John Flanagan, Johnston Testers, Inc., president, and outgoing vice president; Ox Morgan, Falcon Products, Inc., sergeant-at-arms; Leo Cypher, Baash-Ross Tool Co., treasurer and outgoing assistant treasurer; (standing) Vern Mitchell, Security Engineering Division, Dresser Industries, Inc., outgoing assistant secretary; Earl Atkins, Emsco Manufacturing Co., assistant secretary; Jim Hughes, Lane-Wells Co., regent and outgoing president; and Bob Gaylord, Wagner-Morehouse, Inc., deputy sergeant-at-arms.

production in Venezuela was the third monthly increase for this major oil country and it brought the total to a new all-time record of 1,871,100 bbl. daily. Previous high in Venezuelan output was in December 1952 when production averaged 1,861,000 bbl. daily.

The November output represented a gain of 85,300 bbl. daily, or 4.8 per cent, above the previous month. Venezuelan production remained at a depressed level through the first eight months of the year with the upturn beginning only in September.

For the first 11 months of 1953, Venezuelan production averaged 1,749,200 bbl. daily, nearly 55,000 bbl. daily or 3.0 per cent, below the 1952 average of 1,803,900 bbl. daily. Last August, Venezuela's output dropped to a two-year low of 1,682,100 bbl. daily.

Production by weeks in Venezuela during November was: week ended November 2, 1,812,800 bbl. daily; November 9—1,853,900 bbl. daily; November 16—1,868,500 bbl. daily; November 23—1,870,500 bbl. daily; and November 30—1,886,900 bbl. daily.

Colombia's output was little changed from October. Production by operators was: Shell, 42,877 bbl. daily; Texas, 5,150 bbl. daily; Empressa, 33,960 bbl. daily; Colpet, 25,642 bbl. daily, and Intercol, 566 bbl. daily. Intercol's production came from testing operations at Totumal and Buturama. In addition to the total crude output, the Empresa produced 2,444 bbl. daily of condensate.

Canadian production gained sharply by some 32,000 bbl. daily, or 14.1 per cent, to an average of 259,000 bbl. daily during November. The increased output was attributed partly to oil run into the newly extended pipe line to Sarnia.

Although Petroleos Mexicanos, has been withholding regular production information, industry reports indicate output is still lagging behind the year-ago level mainly because of difficulties in export sales.

Brazil Law Attacked

Attorney takes fight over automobile levies to court

TAX features of Brazil's new Petrobras law creating an over-all state oil monopoly have come under legal attack in Rio de Janeiro.

Leoni Doria Machado, a Brazilian lawyer, has asked an injunction to halt Petrobras from collecting the levy from automobile owners that is provided in the law. In order to obtain a license, automobile owners must first secure a receipt from the Banco Brasil showing the Petrobras assessment has been paid.

Terms of the law *(The Oil and Gas Journal, November 9, page 79)* give persons paying the Petrobras tax a certificate to be eventually changed into preferential shares or debentures in the government oil corporation, provided they otherwise qualify as stockholders under national ownership restrictions.

The tax is applicable to automobiles, aircraft, and boats. On private automobiles, it ranges from the equivalent of about $21 up to $168 for cars weighing more than 4,000 lb.

The incorporation of Petrobras has been delayed pending the valuation of the government oil properties it is to receive. The taxes, however, have been collected from the public.

Petrobras bylaws have been published, and figures on value of the properties only recently issued. These place the total assets at 3,000,000,000 cruzeiros, or about $60,000,000, including the Mataripe refinery in Bahia.

34-In. Line Set

Creole lets contract for world's biggest crude line

THE world's largest diameter crude-oil trunk line will be built shortly by Creole Petroleum Corp. in Venezuela.

It will be a 34-in. line running from Lagunillas field to La Salina, on the Bolivar Coast of Lake Maracaibo, a distance of 35 km. (about 21 miles).

Contract already has been awarded to Williams Brothers Overseas Co. Pipe is now being shipped from Philadelphia. Construction is scheduled to begin in February and be completed in about 6 months.

The line will terminate at the La Salina terminal, Creole's principal port on Lake Maracaibo.

Creole said the large diameter will facilitate the movement of viscous crude. Lagunillas produces more than 400,000 bbl. a day of crude having a gravity of about 24.5°.

Operations for Williams Brothers will be directed by Marvin Jones, Venezuelan manager headquartered in Caracas.

British Oil Dock Open

The largest oil dock in Britain, a $27,300,000 installation named after Queen Elizabeth II, has been formally opened at Eastham near the entrance to the Manchester ship canal in Cheshire.

The dock covers 19 acres and was 4 years under construction. It can hold four of the largest-size tankers and can handle approximately 750,000 bbl. of oil within 24 hours. Its formal christening came when the 28,000-ton Shell tanker, Velletia, with a cargo of Kuwait crude, moved across the tide lock to break a ribbon stretched across the entrance.

Features of the Queen Elizabeth II dock include a number of oil weirs, the first of their kind, which suck up waste oil spilled from tankers. This reduces fire hazards, avoids pollution, and recovers oil otherwise wasted.

Rieber Advises Iran

Former Texas Co. board chairman named oil consultant to Iranians as discussions pave way toward settlement

TORKILD RIEBER, president of Barber Oil Co., has been retained by the Iranian Government as its petroleum adviser in connection with efforts to settle the nationalization dispute.

Rieber, former chairman of the board of The Texas Co. and consultant to the International Bank for Reconstruction and Development during its negotiations with Iran early in 1925, is scheduled to arrive in Teheran early in February. Accompanying him will be another oil-industry expert of his own choosing.

T. RIEBER

Rieber's designation as Iranian petroleum advisor was another step in the preliminary moves which will set the stage for formal negotiations. The views of both Britain and Iran have been sounded out during the last 2 months by Herbert Hoover, Jr., as special adviser to the U. S. Secretary of State, and more recently, the resumption of diplomatic relations has allowed British representatives to meet directly with top Iranian officials, including Prime Minister Zahedi.

In Washington, Hoover met at the State Department with 10 congressional leaders from both parties and gave a progress report on the Iranian oil situation to date. The meeting lasted about an hour, and Hoover was reported to have expressed optimism as to the eventual outcome, though believing it will be many months before production can be resumed. He was scheduled to leave again over the weekend for London to continue discussions with the British Government.

Reports from Teheran also spoke of growing optimism in Iran Government circles over the chances of an agreement. The group of American and British companies to undertake distribution and operation of the properties would, it was said, incur an initial expenditure of some $75,000,000. A production of 20,000,000 tons, or about 420,000 bbl. daily, within 3 years was again mentioned. Prime Minister Zahedi was said to be determined to see the Abadan refinery reopen as soon as possible and at the maximum throughput attainable. The reports also said Iran is approaching the Export-Import Bank for a loan of $25,000,000 pending the resumption of oil operations and revenue from that source.

Still months away . . . Although any agreement is still believed to be several months away, there is considerable optimism over the possibilities of a success. While nationalistic and anti-British sentiment in Iran continues strong, the Zahedi Government has indicated its desire to reach some reasonable settlement to provide for resumption of operations and renewed movement of Iranian oil into export markets. Recent discussions in Teheran between Iranian officials and Denis Arthur Wright, British charge d'affaires, were said to show a considerable area in which both sides agreed in principle.

Rieber is know as a thorough realist, and from his many years as a company executive, he is completely familiar with petroleum operations and the international oil trade. As adviser to the World Bank, he visited Abadan and the fields in January 1952 and at that time reported the properties in good order with nothing in their physical condition standing in the way of prompt resumption of operations.

Question of price . . . The price question is one of several difficult problems which must be worked out before a settlement is reached. The compensation issue presumably would be solved by arbitration by some international agency such as the International Court of Justice. Previously this plan was rejected by Dr. Mossadegh unless Anglo-Iranian Oil Co., Ltd., excluded from its claims compensation for loss of future profits.

Although the recent preliminary discussions have been conducted in complete secrecy, there is great interest in the eventual composition of the group which will handle actual operations at Abadan and the fields.

Distribution and marketing of whatever level of Iranian production is agreed on most likely will be through some joint action of the international companies with outlets in the Eastern Hemisphere. Beyond this is the question of the makeup of the operating organization.

The Mossadegh regime rejected suggestions for the employment of British nationals, and it is not known how adamant the Zahedi Government is on this point. In Britain, there have been some outspoken expressions that the British Government should not consent to any agreement which would bar British representation in the Iranian industry.

Exports small to date . . . Meanwhile, a compilation of available information from shipping officials, public announcements, and other sources shows that the total exports which Iran has been able to make in the 2½ years since the British were expelled from the country amount to about 1,566,400 bbl. Exactly how much of this has been paid for and at what price is not known. Figured on a daily average basis over the 2½-year period, the exports average around 1,720 bbl. daily.

Three companies have participated in the liftings — the two Italian firms, Epim and Supor, and the Japanese importing-marketing company, Idemitsu.

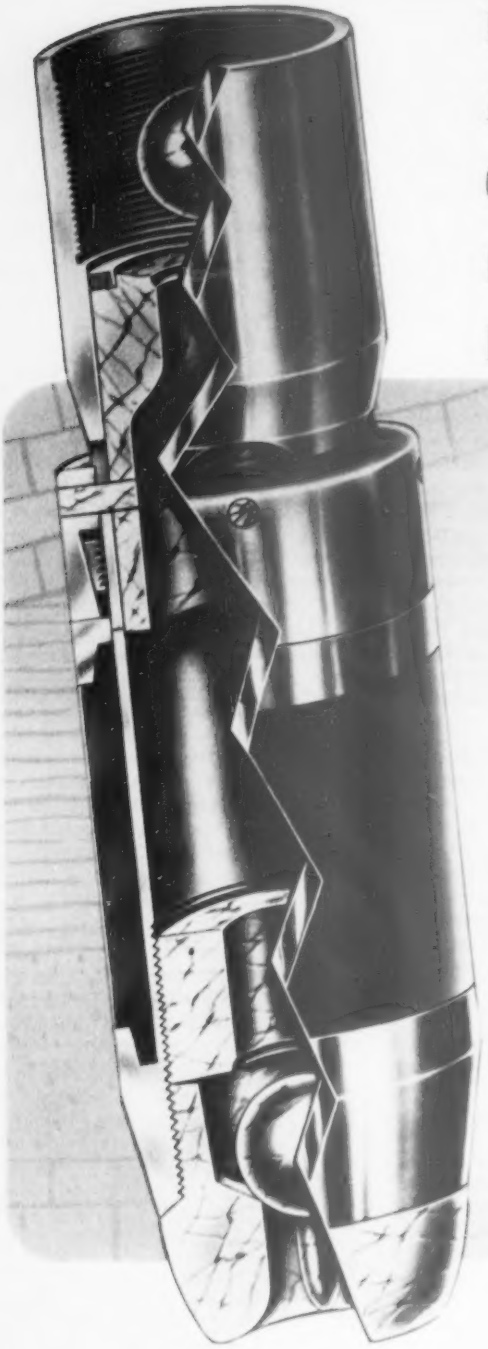
The shipments began in late May 1952 with the Rose Mary whose cargo of 6,000 bbl. of crude oil was taken over by Anglo-Iranian after a court action at Aden. Epim has made only one other shipment, some 34,300 bbl. of crude oil in the tanker Pax last May.

The 451,600 bbl. of crude oil and products shipped by Supor, as well as the Pax cargo, are in storage in two Italian ports at Venice and Leghorn. It is understood the Italian Government has refused import licenses into Italy for this Iranian oil, though presumably it could be refined in bond and reexported to another country.

The Supor purchases have been in eight separate tanker shipments. The total quantity breaks down approximately as follows: fuel oil, 61,300 bbl.; gas oil, 14,500 bbl.; crude oil, 300,000 bbl., and diesel oil, 75,800 bbl. Anglo-Iranian has a court case pending in Rome on its claim to ownership of this oil.

The principal buyer of Iranian oil has been Idemitsu, but this company is understood to have exhausted its currency allotment and the Japanese Government is refusing to grant further exchange for these controversial purchases.

The Iranian oil taken by Idemitsu consisted entirely of products, some of which have been sold on the Japanese market. A Japanese court refused Anglo-Iranian's application for an injunction, but an ownership case is pending. Idemitsu's shipments from Iran, four in the Nissyo Maru, and two in the Koei Maru, amounted to about 1,074,500 bbl., consisting of 778,000 bbl. of motor fuel, 250,000 bbl. of gas oil, and 46,500 bbl. of kerosine.



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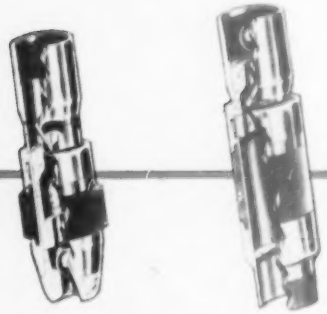

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Swan Directs Brazos

Youthful veteran is named executive vice president

FROM service engineer to executive vice president in only 13 years is the record of Lester B. Swan, of Brazos Oil & Gas Co., Houston.

Swan began his career in the petroleum industry in 1936, joining Stanolind Oil & Gas Co. shortly after graduation from University of Tulsa, where he received a bachelor's degree in petroleum engineering. During his tenure with Stanolind, Swan served as an engineer on drilling, well-completion, and production operations, principally in western Kansas.

He first became affiliated with Dow in March 1940, when he joined Dowell Incorporated, of Tulsa, also a Dow subsidiary, as a service engineer. From this position he rose to station manager and later development engineer at Tulsa.

Swan was promoted to assistant district manager in July 1947 at the Houston office of Dowell. When the firm's New Orleans district was organized in February 1948, he was appointed manager of that district.

Later that year, Swan transferred to Dowell's overseas associates United Oilwell Service, S. A., in Venezuela, and served as executive vice president, general manager, and director of United, with headquarters in Caracas.

Swan returned to Dowell in early 1952 and was assigned to the Tulsa headquarters as assistant general manager. He was later given the added responsibilities as coordinator of Dowell's extensive research program.

A native of Flat Rock, Ill., Swan will make his headquarters with Brazos in Houston, and will be responsible for over-all direction of the company's operations. Brazos Oil & Gas is engaged primarily in petroleum exploration.

Swan is a member of the American Institute of Mining and Metallurgical Engineers.

C. H. Albitz, Houston, has been elected to the board of directors of Texas-Empire Pipe Line Co., an affiliate of The Texas Co.

J. E. Finley, Roswell, N. M., has been appointed division superintendent for Continental Oil Co. at Midland, Tex. He formerly was division geophysicist at Roswell for Conoco, and succeeds **Charlton Kerr,** who has been promoted to the company's executive offices in Houston. **G. H. Swenumson,** geophysical supervisor at Denver, has been promoted to division geophysicist at Roswell succeeding Finley.

H. C. McCarver has been named manager of the geological and geophysical departments of the Mid-Continent division of Seaboard Oil Co. of Delaware. Other changes in the Mid-Continent division include **J. M. Clayton,** named coordinator of geology and geophysics, and **Lamar McLennan,** made chief geologist. **J. E. Lawler** is continuing as chief geophysicist.

Carl A. Houy has been named vice president in charge of exploration and production by Deep Rock Oil Corp., Tulsa. He had been vice president in charge of production since early in 1951. The change is a consolidation of the company's land and exploration division and production division. Houy also is president of Hugoton Plains Oil & Gas Co. He joined Deep Rock in 1950 as general superintendent of crude-oil production.

J. J. Cunningham has joined the design division of Humble Oil & Refining Co.'s Baytown, Tex., refinery staff. Others joining the refinery personnel include: **J. T. Huffsaker,** design department of the engineering division; **W. F. Lampe,** research and development division; and **Buford D. Smith,** and **Wayne E. Stevens,** technical service division.

E. C. Mishou, chief engineer for Interstate Oil Pipe Line Co., Shreveport, has been appointed assistant to the division manager at Shreveport. **S. C. Phelps** has been advanced from assistant to acting chief engineer to replace Mishou.

Stanley F. Davis, Jr., has joined Texas Pacific Coal & Oil Co., Fort Worth, as gas engineer in charge of gasoline-plant and natural-gas operations. He will supervise design and installation of the firm's new plant to be constructed 7 miles northwest of Hamlin, Tex., in northeastern Fisher County. He had been with the gasoline department of Phillips Petroleum Co. for 11 years.

B. M. Downey, manager of Shell Chemical Co.'s plant at Houston, has been appointed manager of manufac-

DOWNEY

FLEER

turing for the company in New York, and **A. W. Fleer,** manufacturing-operations manager, has been named manager of research, development, and engineering. Reporting to Downey will be managers of plants at Houston; Denver; Norco, La.; and Martinez, Dominguez and Torrance, Calif. Downey also will be in charge of the industrial-hygiene department. Downey joined Shell in 1925 and was made manager of the Houston plant in 1946. Fleer will be in charge of the company's research, economic-evaluation, and process-engineering activities as well as the engineering, design, and construction of new plant facilities. Managers of the head-office manufacturing-development and manufacturing-engineering departments also will report to him. Fleer has been with Shell since 1935 and was appointed to his former post in 1952.

Shao E. Tung, Boston, and **Preston L. Gant,** Houston, have joined Continental Oil Co.'s development and research-department staff at Ponca City, Okla. Before coming to the United States from China, Tung served as a chemist with a Shanghai paper mill, and later served as superintendent of a

paper and pulp mill in Formosa. Gant has been associated with Magcobar Mud Co., Houston, since 1952.

K. W. Lewis, geologist, formerly of Evansville, Ind., has been placed in charge of the office recently opened in Denver by W. C. McBride, Inc.

E. O. (Mike) Baird has resigned as drilling superintendent for **S. D. Johnson,** independent operator of Denver.

Philip S. Justice has been appointed general manager of Sun Oil Co.'s Rocky Mountain production division with headquarters in Denver. He succeeds **J. E. Regent,** who is recovering from a long illness. Regent will return to Dallas as special assistant to the management of the Southwest division which is headquartered there. **Donelson Caffery** has been made general manager of the firm's Gulf Coast division. **L. Millard Moor** manager of the crude-oil purchasing and sales department, will succeed Caffery as director of supply and transportation.

Dr. Carl O. Tongberg has been appointed coordinator of the world-wide products research and development ac-

C. O. TONGBERG

C. L. FLEMING

tivities of Standard Oil Development Co., central research and engineering affiliate of Standard Oil Co. (N. J.). In 1937 Tongberg joined Esso Research Center in Linden, N. J., and until his latest promotion was director of the research division of the laboratories. **Dr. Charles L. Fleming,** Jr., has been advanced from associate director to director of the research division, and **Dr. John G. McNab,** formerly assistant director, has replaced Fleming as associate director.

Keith Rathbun, Houston, has been promoted to regional geologist for Continental Oil Co.'s western region at Los Angeles. He formerly was assistant manager of the geological section at Houston. Rathbun joined Continental in 1939, serving in Illinois and in San Antonio before going to Houston.

Tulsa Section of N.A.C.E. Installs New Officers

New officers installed January 25 by the Tulsa section of the National Association of Corrosion Engineers are, left to right: (standing) Samuel E. Bosley, pipe-line sales engineer, secretary; Robert J. LaFortune, Reilly Tar & Chemical Corp., treasurer; and J. N. Hunter, Jr., Service Pipe Line Co., trustee; (seated) Melvin C. Callahan, Gulf Refining Co., chairman; and Richard E. Lembcke, Cities Service Oil Co., vice chairman.

W. T. Payne, chairman of a coordinating committee appointed to make studies and recommendations aimed at revamping Oklahoma's proration setup, last week appointed two committees to assist in the work. Named to a legal committee were: **Barth Walker,** Oklahoma City attorney, chairman; **Forrest M. Darrough,** Carter Oil Co., Tulsa, vice chairman; **H. F. Aby,** Midstates Oil Corp., Tulsa; **J. D. Dubois,** Duncan; **Cecil Hamilton,** Phillips Petroleum Co., Oklahoma City; **Houston B. Hill,** Oklahoma City; **R. L. Imler,** Sinclair Oil & Gas Co., Tulsa; **George N. Otey,** Ardmore; **Murray Robinson,** Oklahoma City; **George Sellinger,** Skelly Oil Co., Tulsa; and **John Woodward,** Amerada Petroleum Co., Tulsa.

Appointed to the statistical committee were: **J. M. Linehan,** Mid-Continent Petroleum Co., Tulsa, chairman; **R. G. Bandy,** Midland Cooperative Refining, Cushing, vice chairman; **P. M. Broach,** Sunray Oil Corp., Tulsa; **R. O. Dietler,** Stanolind Oil Purchasing Co., Tulsa; **M. Lloyd Freese,** Bell Oil & Gas Co., Tulsa; **C. S. Mitchell,** Cities Service Oil Co., Bartlesville; **Fred H. Moore,** Magnolia Petroleum Co., Dallas; **J. F. Nickell,** Wilcox Oil Co., Tulsa; **C. A. Nyhof,** Shell Oil Co., Tulsa; **H. G. (Bill) Williams,** Wood River Oil & Refining Co., Wichita; and **Dave A. Young,** Sinclair Crude Oil Purchasing Co., Tulsa.

Sequoyah H. Brown, manager of employe relations, has been elected to the board of directors of Interstate Oil Pipe Line Co., Shreveport.

J. F. O'CONNELL

John F. O'Connell, vice president of Bechtel Corp., San Francisco and New York, has been elected president of the National Constructors Association, an organization composed of firms engaged in the engineering and construction of chemical plants, refineries, and other industrial facilities. **J. H. Sharpe,** construction manager for Arthur G. McKee & Co., Cleveland, has been named vice president. Other members of the group's executive committee include: **E. R. McGonnigle,** M. W. Kellogg Co., New York; **C. C. Whittelsey,** Ford, Bacon & Davis Construction Corp., Monroe, La.; **T. C. Williams,** Stone & Webster Engineering Corp., Boston; **W. R. Wood,** Girdler Co., Louisville, Ky.; and **L. C. Reynolds,** C. F. Braun & Co., Alhambra, Calif.

PERSONALS

Ray Tull has been elected vice president of Canbridge Corp., Ltd., Canadian drilling firm, and **E. H. Farmer** has been named field superintendent with five rigs under his supervision.

B. B. Colley, Houston, assistant regional geologist for Continental Oil Co.'s southern area, has been promoted to assistant manager of the company's geological section. He joined the firm at Houston in 1950.

Lewis R. Pomeroy, III, petroleum engineer with Continental Oil Co., has been transferred from Houston to Basile, La.

H. R. Bolton has been promoted by Deep Rock Oil Corp. from chief engineer to manager of production. He has been succeeded by **J. W. Hudson,** who also will retain his duties as drilling superintendent. **R. B. Hurlbutt,** with Deep Rock since 1951, has been placed in charge of the geological department. Bolton joined the company in 1950 as chief engineer, and Hudson came to Deep Rock in 1951 as general superintendent.

H. G. BURKS, JR.

Dr. Harry G. Burks, Jr., executive vice president of Esso Standard Oil Co., has been named coordinator of the world-wide refining activities of Standard Oil Co. (N. J.) He succeeds **Harold W. Fisher,** who recently was appointed shareholder's representative for Jersey affiliates in the United Kingdom and chairman of the company's coordination committee for Europe. Dr. Burks, a director of Standard Oil Development Co., joined the Jersey Standard organization in 1924 as a development engineer at the Bayway refinery. In 1943 he was elected a director and 3 years later was made general manager of Esso Standard's East Coast manufacturing operations. He has been executive vice president since 1949.

W. E. Owen has been promoted by Shell Oil Co. from chief exploitation engineer at Midland, Tex., to manager of the firm's northern production division with headquarters in Hobbs, N. M. He replaces **C. R. Bickel,** who has been transferred to Shell's Midland office on special assignment. Owen, who had been at Midland since 1949, will supervise all the company's production activities in southeastern New Mexico and in 23 West Texas counties.

William F. C. Mackie, manager of the Punta Cardon refinery of Compania Shell de Venezuela, has been selected to receive the award of Officer of the Order of the British Empire (O.B.E.) by Her Majesty Queen Elizabeth II. He was appointed British vice consul in Punta Cardon early in 1950 and is presently on leave in England.

M. W. BOYER

Marion W. Boyer has been elected executive vice president and **Edwin H. Collins,** vice president, of Esso Standard Oil Co. **Osgood V. Tracy** and **Glenn W. Poorman** also have been elected to the board of directors. Boyer, who has been with the company's manufacturing operations for 25 years, returned to the firm last fall after 3 years as general manager of the Atomic Energy Commission. Collins, with the company for 30 years in the marketing operations, has been a director and member of the executive committee since 1949. Tracy is general manager of the chemical products department, and Poorman is general manager of the supply department.

New Nomad Chief Takes Over

Norris L. Boulden, International General Electric Co. (left), was recently elected president for 1954 of the New York chapter of Nomads. He is shown receiving the gavel from retiring president Russ V. McIntire, Baker Oil Tools, Inc. Other new officers elected are: Stewart D. Beckley, Beckley, Haltom & Hickman, vice president; Herb E. Maland, R. J. Eiche & Associates, Inc., secretary; Herman Gottwald, Rockwell Manufacturing Co., assistant secretary; R. E. James, Security Engineering Division, Dresser Industries, Inc., treasurer; Holland W. Smith, Holland Smith Supply Corp., assistant treasurer; Joe L. Comer, William Powell Co., sergeant-at-arms; Douglas L. Grill, Link-Belt Co., assistant sergeant-at-arms; and A. A. Dill, Axelson Manufacturing Co., and McIntire, regents.

DEATHS

Sir John Traill Gargill, 87, who for 38 years was chairman of Burma Oil Co., Ltd., which his father founded, died January 24 in Edinburgh, Scotland. In 1943 he resigned from the boards of Burmah Oil, its subsidiary companies, and from Anglo-Iranian Oil Co., Ltd., on which he served since the firm's incorporation in 1909.

Herbert E. Read, 60, a supervisor at Cities Service Oil Co.'s refinery in Linden, N. J., died January 22 in Roselle, N. J., after a brief illness.

Scott Bowers, Sr., 69, former independent operator in East and West Texas, died January 24 in San Antonio following a 3-year illness.

James Percy James, 57, independent operator, died January 26 in Houston.

Arthur B. Andrade, 66, a driller for about 30 years and one of the first in the Signal Hill area, died recently in Anaheim, Calif.

V. V. Bright, 64, retired manager of the crude-oil purchasing department of Gulf Oil Corp. in Houston, died January 21 in Houston.

Harold David Leatherwood, 27, field engineer for Schlumberger Well Surveying Corp., Houston, was killed recently in an automobile accident in Houston.

Joe P. Triplett, 75, pioneer driller in Oklahoma, died January 25 in Hot Springs, Ark. He was Magnolia Petroleum Co.'s drilling superintendent in Kansas when he retired about 10 years ago.

Hunter W. Pryor, 50, head of the tax department of Arkansas Fuel Oil Corp., died January 27 in Shreveport, La.

1 TIDE WATER ALL-ELECTRIC RIG on location in Ventura Avenue oil field. From left to right are seen portable substation, motor-generator sets, dolly walk, pipe rack, draw-works housing, and mud pumps.

All-Electric Rig Drilling in Ventura Avenue Field

by Martin Mears* and Charles J. Manner†

THE Tide Water Associated Oil Co. has recently installed a completely electric 1,500-hp. drilling rig at Ventura, Calif. The electric-power equipment combines the smoothness and flexibility of direct-current variable-voltage control with the reliability and convenience of alternating-current power.

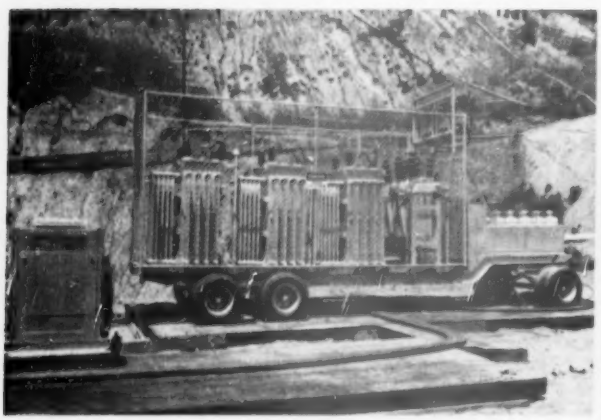
Results show that it is practical to drill with electric power, and that the larger the rig, the better the economy. The use of a.c.-to-d.c. power combines the advantages and conveniences of both the electric utility power system and the d.c. variable-voltage drive.

The improved performance at both high speeds and high torques means faster operation when coming out of or going into the hole, so that more time is spent on bottom. Improved efficiency, reduced lost time, and simplified and greatly reduced maintenance all result in greater economy in drilling a well.

The electrical setup is very easily taken down and made up. All electrical circuits can be reestablished in an 8-hour working day by three men, since polarized plugs and receptacles are used on all control cables. The cables are transported in place when the rig is moved.

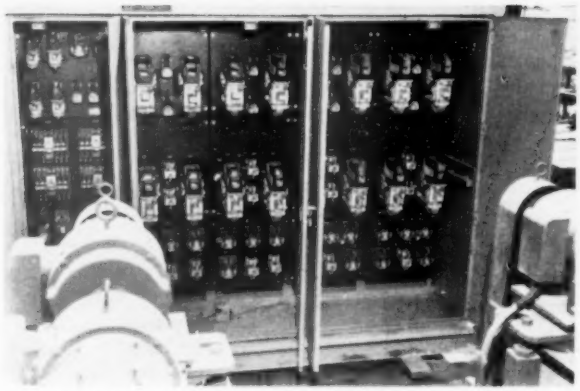
Available power . . . The present Ventura oil field is adequately covered by a network of 16,500-volt a.c. power lines and drilling is expected to continue for many years within this area. The new equipment is not intended for open wildcatting so a self-sufficient power system is not required. In order to protect the hole in event of power failure, two gas engines rated at 150 hp. each are maintained on a standby

*Superintendent of drilling, western division, Tide Water Associated Oil Co., Ventura, Calif.; and †engineering and service department, Westinghouse Electric Corp., Los Angeles.



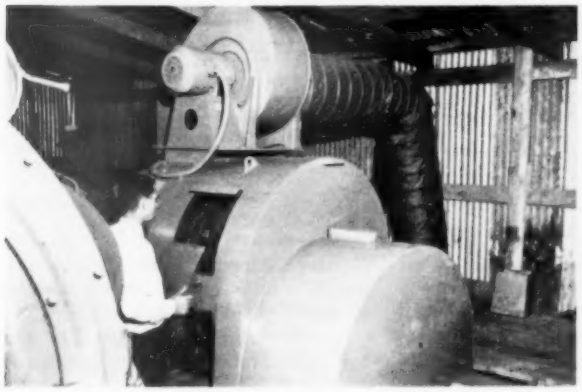
2 PORTABLE SUBSTATION, 1,500-kva. capacity. Power enters from pole line through no-load disconnects to protecting oil circuit breaker. Output is distributed through cutouts at right.

3 MOTOR-GENERATOR SETS are used to convert a.c. power to d.c. power required for the drilling operations. A.c. motors are 380 hp., induction type. Generators are 250-kw. variable-voltage type.

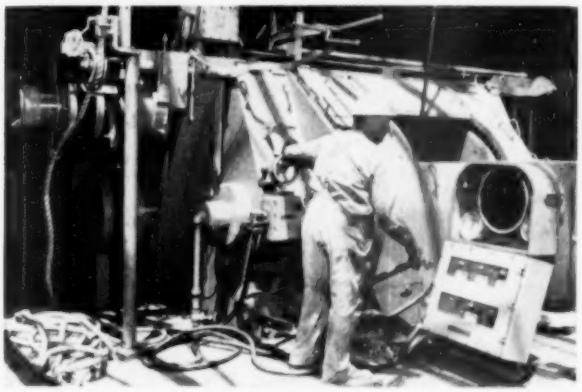


4 FRONT SECTION of d.c. control cabinet. Left panel includes control relays and auxiliary generator contactors. Center and right panels contain the 16 main generator contactors used for operating flexibility.

5 REAR VIEW of d.c. control cabinet, showing the polarized plugs and receptacles. Each of the four generators has four main contactors, used to connect the generator to any one of the four main d.c. motors.



6 DRAW-WORKS MOTOR, rated at 800 hp., 600 r.p.m. Flexible duct brings pressurized cooling and flushing air to motor. Motor drives draw works through roller chain; gains 400,000 lb. hook pull with three generators.



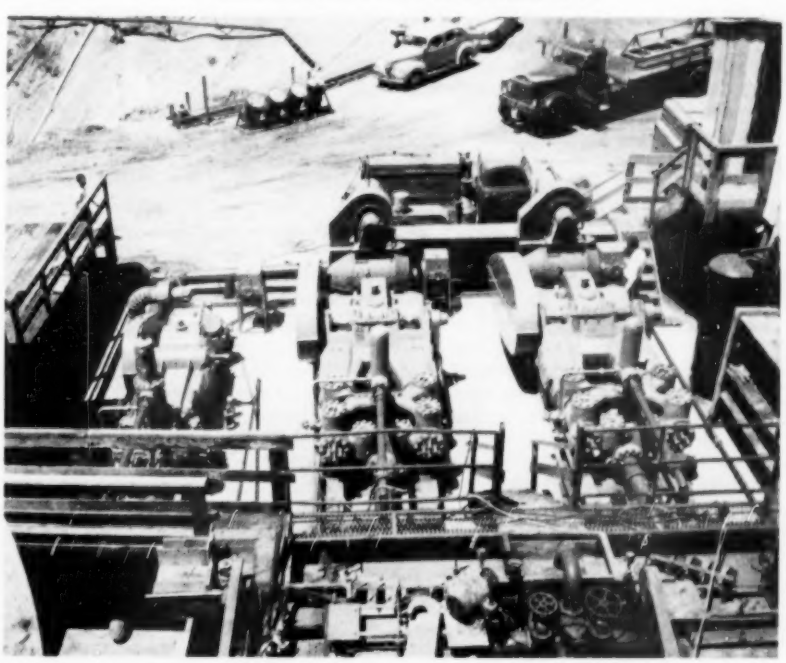
7 DRILLER operates draw-works motor-control hand wheel with left hand. Below hand wheel is emergency stop button and drill-hoist push-button selector used to pick desired generator combinations to run draw works and rotary table.

basis. These engines can provide 300-hp. for rotating the bit, hoisting, or pumping mud in case of emergency.

It is not unusual to use a.c. power to operate oil-well drilling equipment. The Hild drive is a familiar example of the use of wound-rotor induction motors. However, this drive has been limited to relatively low horsepower and the expensive and large secondary resistors necessary for speed control are wasteful of power and lack the fine degree of control available in the variable-voltage d.c. drive. It is unusual to find a 1,500-hp. drilling rig driven by a.c. power.

The a.c. transmission system makes it possible to use large induction motors. This efficient and time-proven constant speed motor drives a direct-current generator which in turn delivers power to the d.c. motors on the drilling equipment. The d.c. motors are started, stopped, or reversed by the simple means of turning a small field rheostat controlling the excitation of the generators (Fig. 1). The single-line power diagram of the rig is shown in Fig. 2.

No other means of power lends



8 MUD PUMPS are also driven by d.c. electric motors. On the left is a 100-hp. mixing pump. Center and right are two 500-hp. main mud pumps. Each mud pump motor has its own master controller.

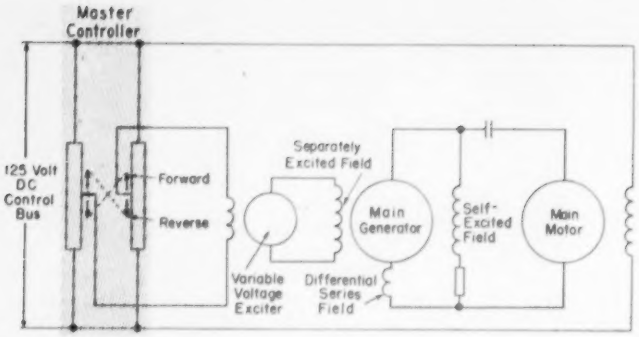


Fig. 1—Schematic control diagram for one generator and motor.

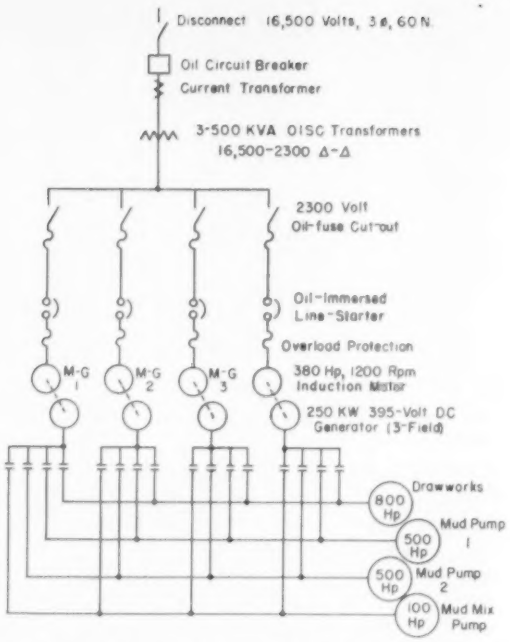


Fig. 2—Single-line power diagram of Tide Water electrified rig.

itself so well to severe and unusual operating conditions as does the direct-current variable-voltage drive. Input horsepower and speed curves attained by this drive at varying percentages of full-load torque are shown in Fig. 3.

The d.c. generators may be driven by gas-turbine, diesel, or gas engines, or a.c. motors. The choice depends upon the economy determined by their availability and costs of the various forms of energy in the oil field at hand. In this case, Tide Water found the a.c. motor ideally suited to its needs because of low power costs, low maintenance, and high over-all efficiency.

Major Electrical Equipment

A 1,500-kva. trailer-mounted substation takes power from the a.c. network at 16,500 volts and steps it down to 2,300 volts. This power drives four 380-hp. a.c. induction motors, which are shaft-connected to four 250-kw. d.c. variable-voltage generators. From these generators, d.c. power is fed to the four motors driving the drilling equipment. These motors are: an 800-hp. 600-r.p.m. draw-works motor, two 500-hp. 900-r.p.m. main mud-pump motors, and a 100-hp. 900-r.p.m. mud-mixing pump motor. A control cabinet, of weatherproof construction, houses all contactors, control switches, relays, and meters for the d.c. generators and motors.

The table is rotated from the draw works, so no table motor is used.

The 800-hp. draw-works motor is capable of delivering 1,340 hp. intermittently to the draw works and can develop 225 per cent of full-load torque momentarily. The main motors are shunt wound with marine-type Class B insulation, rated 60° C. rise continuous duty, and can be operated continuously at 125 per cent speed. These motors are ventilated by means of a separate motor-driven blower unit mounted on top of each motor.

This forced ventilation assures a full measure of ventilating air regardless of the speed of the motor. Fresh air is picked up by the separate blower units through a pressurized manifold that runs the length of the draw works and dolly walk to a point near the control cabinet outside the hazardous area. Therefore, an ample supply of safe air is assured to the main motors under gaseous conditions which may be encountered as well as under all conditions of variable speed and load.

Generators . . . The 250-kw. main generators are of the three-field variable-voltage oil-field type. The three fields consist of:

1. A separately excited shunt field.
2. A self-excited shunt field.
3. A differentially excited series field.

The separately excited field is adjusted by the operator's master controller to obtain the desired speed or torque on his motor. The cumulative self-excited field raises the voltage at light load and the differential series field reduces the voltage to nearly zero at 200 per cent of full generator load current. The use of these three fields gives the generator the most desirable power-transmission characteristics for oil-field application.

1. The rapidly drooping voltage gives high speed at low torque and low speed at high torque. Thus suddenly increasing or dangerous loads are apparent to the driller by the audible and visual slowing down of the drive.

2. The limit in no-load voltage assures limited maximum no-load speed of the pump and the draw works or rotary table.

3. The limit in maximum generator current means that a safe limit in mud-pump pressure, line pull, or table torque is established.

4. The inherent limit in maximum horsepower protects the a.c. motor from overloads. The load on the a.c. motor is actually reduced when the hoist motor is at stall and pulling the hardest.

5. The d.c. transmission system is designed to make the best use of the available power. The d.c. system automatically adjusts itself to meet the load conditions and effectively provides a continuously variable speed ratio between the prime mover and the load.

6. Rapid starting and stopping is accomplished since full power is available for acceleration and regeneration. The draw-works motor can be brought to full speed in about 3 seconds from standstill.

7. The use of electrical cable for transporting power to the draw works and the mud pumps makes it possible to locate the pumps and motor-generator sets, controls, and transformers according to the convenience of the drilling site.

8. Noise is reduced to a minimum since the generators are some distance from the drilling floor and the d.c. motors are relatively quiet. The absence of loud noise makes conversation easy in the vicinity of the rig, greatly enhancing working conditions and promoting safety.

Operation of Equipment

By means of the master controller, the driller adjusts the separately excited generator field, making the full range

of voltage and power available as he desires. As the controller is advanced the voltage increases from zero to 125 per cent rated voltage at light load, or on a heavy pull the torque increases to 225 per cent full-load torque.

If the controller is partially advanced, then the maximum motor speed or torque is correspondingly adjusted. Further advancing the controller produces progressively higher speed or torque. Advancing the controller beyond the point corresponding to the generator current and motor torque required to just support the load, increases the voltage at this torque. This increase in voltage immediately results in accelerating the load. With the controls in the full-on position, the voltage will increase to the maximum value possible for the existing current value.

Each motor has a permanently assigned master controller regardless of number of generators used to provide power for its motor. However, in the case of the draw-works controller, an emergency transfer switch is provided so that either the No. 2 mud pump or the mud-mixing-pump controller may be used in case of an accident on the drill floor that would put the regular draw-works controller out of commission. Also, a special setup is provided whereby both main mud pumps can be operated in parallel from the No. 1 mud-pump controller.

Generator operation . . . With two or more generators operating in parallel on a motor, the voltage rises to a value determined by the combined characteristics of the machines. The maximum voltage at no-load is still 125 per cent rated but the stall current and torque are increased proportionately to the number of generators in parallel. For instance, the maximum stall torque available with four generators is about four times that with one. The draw-works motor may be powered with three or four generators for maximum hoisting duty or with just one generator when used for rotating the table. The main mud pumps will develop full power capabilities with two generators.

The many points of the controller means that the increments in voltage steps are small, assuring smooth acceleration of any load. During hoisting, the controller is usually advanced quickly to full-on after the drill stand has been lifted from the slips. Even so, the acceleration is steady without shock, for the generator fields determine the acceleration rate.

The electrical controls at the mud pumps consist of a master control hand wheel and an emergency stop button and lockout switch. The lockout can be used to padlock the emergency stop button in the off position so that it is impossible to run the mud-pump motor while maintenance work is being performed.

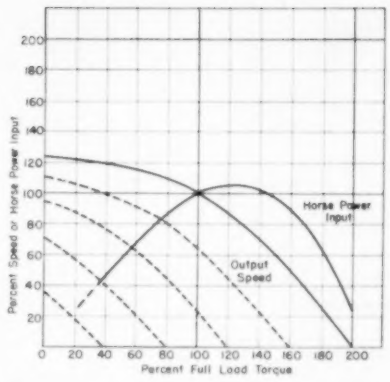


Fig. 3—Input horsepower and speed curves for variable-voltage d.c. drive used on Tide Water rig.

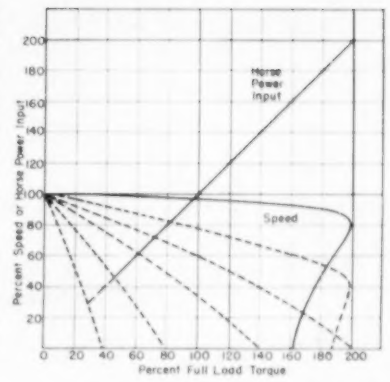


Fig. 4—Input horsepower and speed curves for three-phase wound-rotor induction motor with secondary resistor speed control.

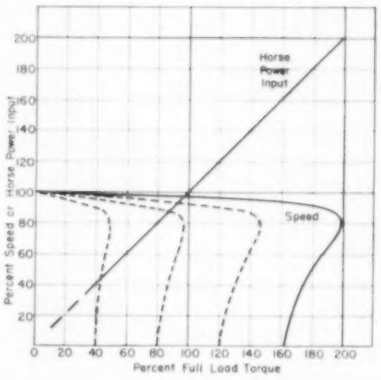


Fig. 5—Input horsepower and speed curves for three-phase induction motor with primary voltage control or an eddy-current coupling with adjustable field strength.

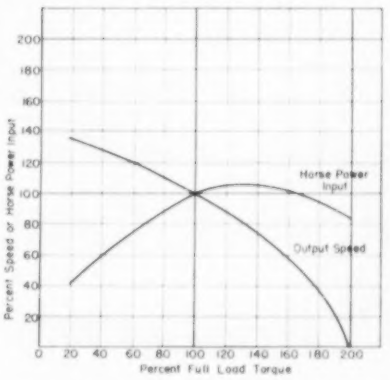


Fig. 6—Input horsepower and speed curves for hydraulic torque converter with constant input speed. Speed control not available except by changing speed of driver.

The mud-pump master controllers are interchangeable electrically and physically with the draw-works master controller, and are reversible. However, they are operated normally with a removable stop which prevents reverse operation of the handwheel. When it is necessary to operate the mud-pump controllers in the reverse direction, this stop is easily removed.

Electrical controls . . . The electrical controls at the driller's post consist of the master control hand wheel, an emergency stop push button, and a drill-hoist transfer switch. This transfer switch features the convenient selection of power distribution to the various motors for two basic requirements in drilling practice. That is, the power requirements are usually different for drilling when the table is rotating and mud is being circulated in the hole as compared with the power requirements for coming out of the hole or going into the hole when the hoisting operation requires most of the power.

For instance, if the driller determines that full power is needed on the hoist motor and the mud pumps are no longer required, he simply presses the hoist selector button which automatically reassigns most of the generators to the draw-works motor, if the generators have been so prearranged. As soon as the draw-works controller is returned to the off position, the controls are automatically reset, the generators are reassigned, and full power is immediately available on the hoist.

When the drill setup is used with, and only one generator is assigned to the draw-works motor, the motor still has enough power to slowly lift the drill pipe so that ordinary manipulations requiring hoisting while drilling can be carried on without disturbing the other generator assignments to the mud-pump operations.

Emergency stop . . . The emergency stop button at the driller's post will disconnect all power from all the motors instantly and is intended to be used only in case of trouble. After the emergency stop button is released, each

(Continued on page 89)

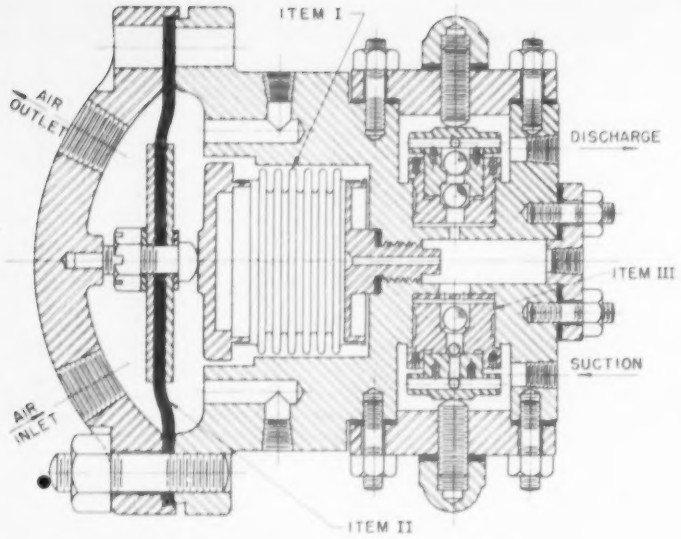


Fig. 1—Original design of sample-pump element.

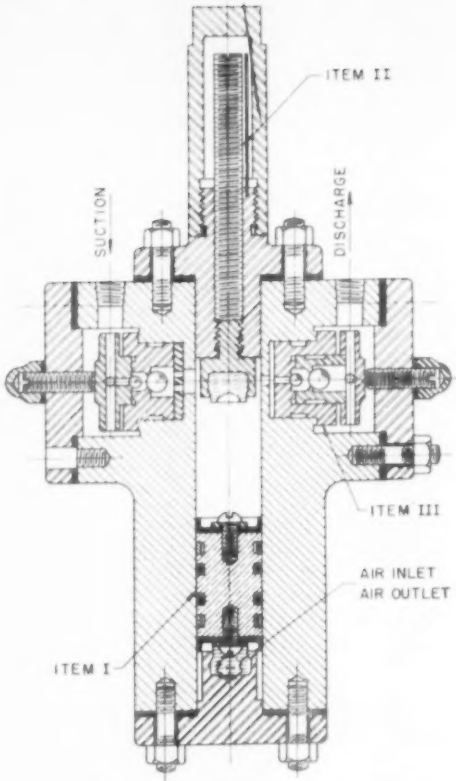


Fig. 2—New element for sample pump.

PETROCHEMICAL POINTERS

Automatic Sampling Of Hydrocarbons

. . . in direct proportion to the flow

by W. E. Gibson

THE need of an improved means for obtaining composite hydrocarbon samples automatically has been recognized in the chemical and petroleum industry for years. This is especially true for accounting streams or for any stream requiring accurate sample control. The taking of such samples manually is unreliable under the best of conditions. The solution in the form of an automatic sampling device is described here.

In the operation of the government-owned butadiene plant by Shell Chemical Corp., the method of taking composite samples manually from the feed stock and recycle-accounting lines proved extremely unreliable. It was desired to obtain a 4-l. sample over a 7-day period. In some cases it was found that the sample bomb would be filled in 3 or 4 days, while in other instances no sample had been drawn off in the entire period.

In order to eliminate the human element in this operation, and assure reliable samples, the market was investigated for an automatic composite hydrocarbon sampler. Nothing was found that would meet the specifications desired by the chief chemist. These were: (1) Fully automatic and leakproof; (2) frequency of the sample cycle in direct proportion to the line flow; (3) quantity of each sampling cycle sufficient to give a 4,000-cc. composite sample in 7 days; (4) adjustable for longer or shorter sample increments, if desired; (5) all drive equipment to be fully explosionproof.

Automatic Sampler Design

To meet these requirements the author undertook the design of a fully automatic hydrocarbon-sampling device. The original design of the sample-pump element is illustrated in Fig. 1. The three main component parts consist of the bellows measuring chamber and pump, Item I; the operating diaphragm, Item II, and the double ball-check valves, Item III. The space between the diaphragm and bellows is filled with a light grade of oil and connects to an atmospheric sight glass. This provides a means of detecting any leaks in the sampler. The quantity of the sample may be varied by changing the bellows size. The range, however, is limited to the economical design limitations of the bellows and requires dismantling of the unit with the attendant interruption in the sampling cycle. This type of sampler operated successfully for 2 years, prior to placing the plant in standby.

In order to overcome the disadvantages in this model and provide greater flexibility, a new element was designed as shown in Fig. 2. In this unit the bellows and diaphragm are replaced by a floating piston, Item I, thus permitting control of the sample quantity while in operation by changing the piston stroke with the adjusting screw, Item II.

Manual Composite Sampling

Four-liter sample bombs are used for the composite samples. Nozzles are provided in either end for inlet and drawoff, one of which has an insert projecting 2 in. inside the bomb.

The laboratory prepares the bombs for sampling by filling with water to the insert and providing an inert-gas cap pressured for the desired operat-

Author is with Shell Chemical Corp. at Torrance, Calif. Paper presented at A.S.M.E. annual meeting, November 29-December 4, 1953, New York.

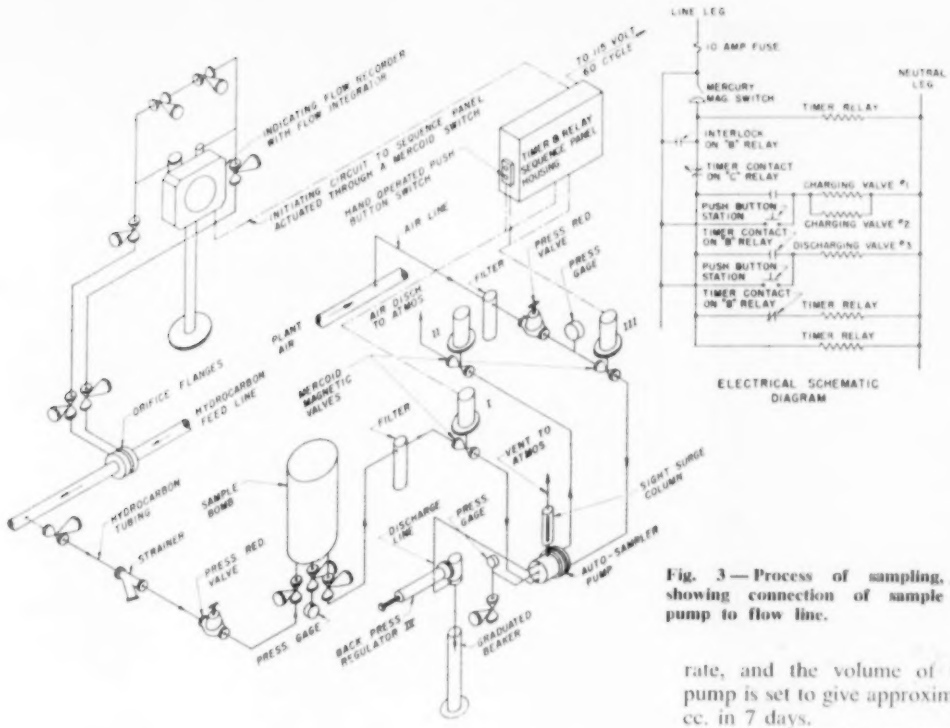


Fig. 3 — Process of sampling, showing connection of sample pump to flow line.

ing conditions. The sample is taken by displacing a measured amount of water from the bomb with hydrocarbon.

In manual operation the operator draws off the desired number of cubic centimeters of water per sample increment into a graduated transparent measuring tube. The graduations are in increments of 50 cc. from zero to 4,400.

Automatic Sampling

In automatic sampling a 6-l. bomb is used. In order to avoid a hydrostatic condition developing from a leak in the vapor phase, valves are located in the liquid phase only.

The automatic operation is identical for both models of sampler. The sample pump is connected to the flow line as shown in Fig. 3. The sample connection is taken off the flow line downstream of the orifice meter and connected to the bottom of the sample bomb. The desired operating pressure in the bomb is maintained by the pressure-reducing valve in this line. The water drawoff line connects from the insert nozzle on the bomb to the suction of the sample pump through the solenoid-operated valve No. 1. The discharge from the sample pump connects to the cubic centimeter-measuring tube through the back-pressure regulator valve No. 4. This valve is set to operate at a pressure of 10 psig. above that maintained in the bomb.

The operating air is connected to the air-inlet connection on the sample pump through the solenoid-operated valve No. 3. The exhaust air is vented to the atmosphere from the pump through the solenoid-operated valve No. 2.

The sample cycle is controlled in direct proportion to the flow rate in the line sampled. This is accomplished through a time-relay sequence wired as shown on Fig. 3. These relays are energized through a mercoid switch actuated by a small magnet attached to an integrating gear of the integrating flow recorder. Therefore, the operating sequence is initiated once for every revolution of this gear and is in direct proportion to the flow rate.

The relays are set to operate the solenoid valves in their proper sequence and with the specified time lag. When the relays are energized, solenoid-operated valves Nos. 1 and 2 open immediately, admitting a charge of water from the bomb into the sample pump and venting the air chamber to the atmosphere. Throughflow to the measuring tube is prevented by the back-pressure regulator valve No. 4. After the preset time lag, these valves close and the solenoid-operated valve No. 3 opens admitting the operating air to the air chamber, forcing the measured quantity of water into the measuring tube, thus completing one sample cycle. This air pressure is maintained at a pressure 10 to 15 psig. above that of the back-pressure regulator valve No. 4.

The operating cycle is approximately 20 minutes, depending upon the flow rate, and the volume of the sample pump is set to give approximately 3,800 cc. in 7 days.

With this sampler we have been able to obtain reliable composite samples over an operating period of 4 years. The bellows type has been retired in favor of the more flexible floating-piston type.

Although this sampler was designed primarily for hydrocarbon service, it could be adapted to other liquids by the use of a medium in the sample bomb not soluble with the sample. It also could be used to pump directly into the bomb by proper valving and controls.

Conclusions

An automatic sampling system for hydrocarbons has been developed with these features inherent in its design:

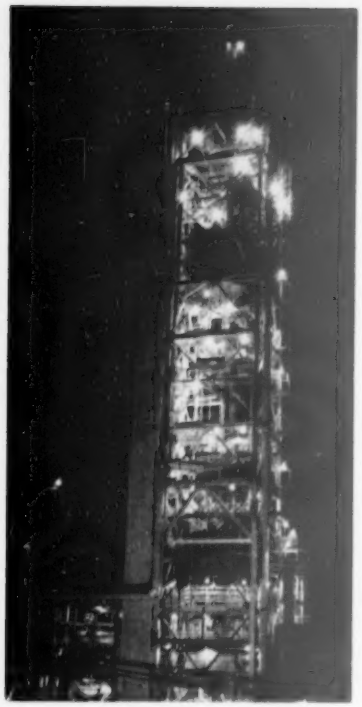
1. The system is fully automatic and leakproof. Latest design incorporates a pump, a floating piston, and double ball-check valves. An adjusting screw permits changing the piston stroke while the pump is in operation.

2. Frequency of the sample cycle is in direct proportion to line flow. This is accomplished through a time-relay sequence with mercury switch actuated by a small magnet. The magnet is attached to an integrating gear of the flow recorder.

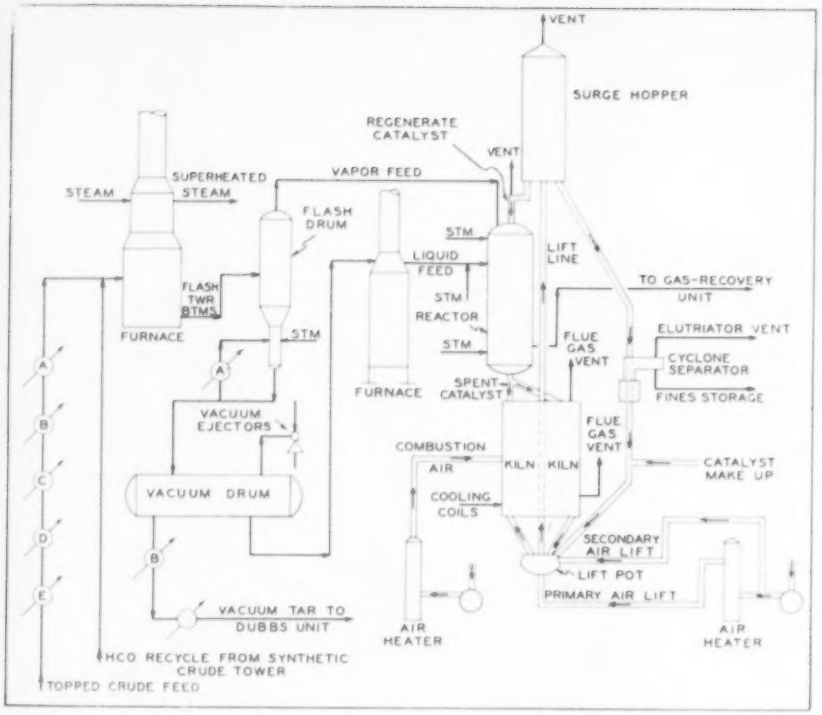
3. Desired sample is about 4,000 cc. over a 7-day period; actual sample is approximately 3,800 cc. over this time interval.

4. The system is adjustable for longer or shorter sample increments.

5. All drive equipment is fully explosionproof. Compressed air is used throughout, where applicable.



CAT CRACKER at Okmulgee refinery of Phillips Petroleum Co.



FEED PREPARATION and catalytic cracking units. Wide-boiling topped crude is flashed to furnish clean vapor T.C.C. feed. Fig. 1.

TARGET AT OKMULGEE . . .

Fifty Per Cent Boost in Gasoline, Distillate

. . . while holding manufacture of heavy oils constant

by John C. Reidel
Journal Staff

PHILLIPS PETROLEUM CO. has added, to its Okmulgee, Okla., refinery, a nominal 8,000-bbl. per day T.C.C. air-lift cat cracker, a new feed-preparation unit, and gas-recovery plant. The existing catalytic polymerization unit has been revamped to accommodate the feed coming from the cat cracker.

The new facilities have made possible increased gasoline and distillates production while holding manufacture of heavier oils essentially constant. Crude-oil throughput previously ran at about 8,600 bbl. per day. The plant is presently operating at 12,000-bbl.-daily crude throughput. It is anticipated that this will be raised gradually to above 15,000 bbl. per day.

Points of particular interest in the new Okmulgee processing are the high-vacuum unit in the feed-preparation section, the deethanizing absorber employed in gas recovery, and the revamped poly unit. New operations have been integrated under the supervision of Refinery Superintendent G. F. L. Bishop. Phillips' project engineer on the expansion job was G. A. Moyer. New facilities at Okmulgee were constructed by Fluor Corp.

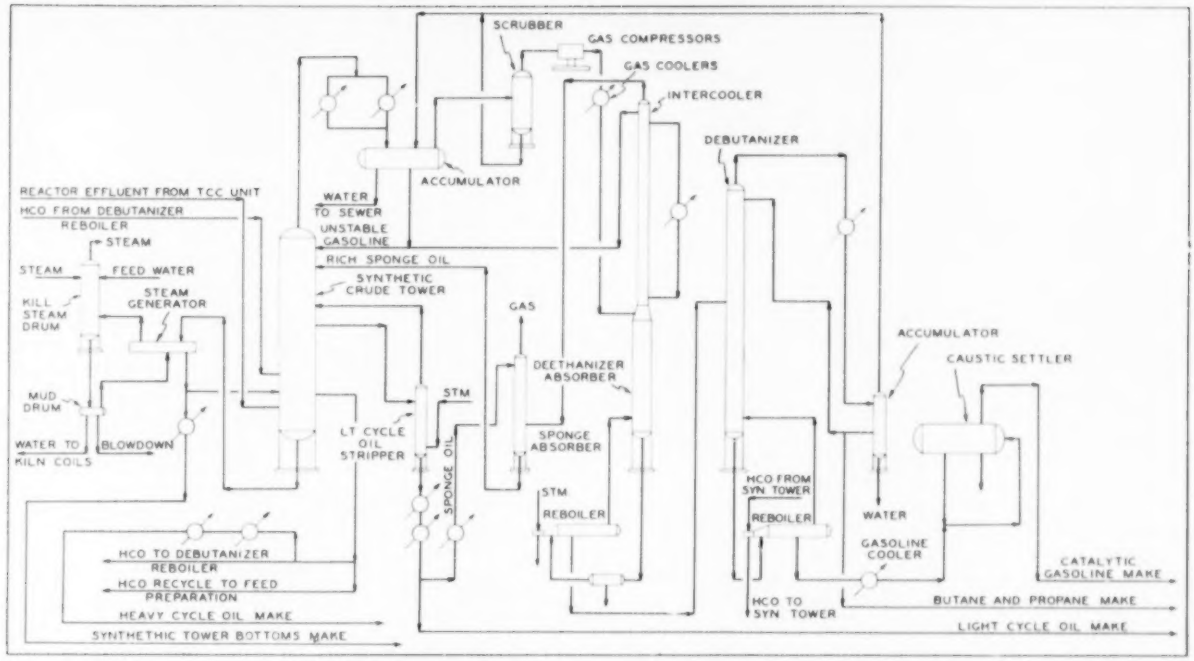
I—NEW REFINERY PROCESSING

Charge to the refinery is mixed Oklahoma and West Texas crude oil with average gravity of 38° A.P.I. This charge stock is topped to produce three grades of solvent naphtha, straightrun gasoline, kerosine, and a light gas oil that goes to No. 2 and No. 3 heating oil. The topping operation employed before installation of the new cat cracking facilities also took off, in addition to the fractions just mentioned, a heavy gas-oil side cut amounting to 15-20 per cent on crude. This left some 25-30 per cent of crude-oil charge as topped crude. The heavy gas oil and the topped crude were formerly cracked in blocked operation on a Dubbs thermal cracker.

In the present operation these two fractions are not separated. Instead, a long-range topped crude amounting to about 40-50 per cent of the crude-oil charge is made in the atmospheric crude distillation. This new operation reduces the heater load on the crude still with resulting increase in capacity. Additional capacity increase has been obtained by rearrangement of heat-transfer surface.

Feed Preparation

The wide-boiling topped crude is processed as follows (see Fig. 1): (1) preheated to about 350° F. through heat exchange, (2) raised to about 850° F. in a large fired heater, and (3)



GAS-RECOVERY UNIT for reactor effluent from T.C.C. unit. Fig. 2.

flashed at near atmospheric pressure to furnish clean vapor feed to the T.C.C. unit.

Bottoms from the atmospheric flash drum are then charged to a high-vacuum unit operating at less than 2 mm. Hg absolute pressure and producing a clean vacuum gas oil which is heated in a smaller fired heater and constitutes the liquid feed to the cat cracker.

A cylindrical, vertical-tube Petrochem heater is employed as the main feed heater to vaporize the topped-crude charge. This is equipped with a steam superheater section to provide superheated steam for the lift air blower turbine drive and for other cat cracker processing needs. Oil tubes are made of 5 per cent chrome steel while the steam tubes are of carbon steel. Separate radiant and convection sections are provided, an arrangement which does not follow conventional Petrochem design. Total design heat input is 51,200,000 B.t.u. per hour. Heater is designed for operation at low excess air, in the range of 15 to 25 per cent.

Flash drum . . . The heated raw feed stream is flashed at substantially atmospheric pressure and about 840° F. design temperature in a vertical flash drum equipped with four stripping trays (side-to-side pans) located in the long leg at the bottom of the drum. A portion of the flash-drum bottoms is cooled by heat exchange and circulated back to the tower bottom to control the temperature below the coking point. Flash drum is constructed of 11-13 per cent chrome steel throughout.

High vacuum unit . . . The high vacuum unit is designed to operate below 2 mm. Hg absolute in the flash zone. The horizontal vessel is 11-13 per cent chrome clad throughout. Reduced topped crude from the atmospheric flash tower is flashed in one end and clean vacuum gas oil for T.C.C. liquid feed is yielded from the opposite end.

The reduced-crude charge to the high-vacuum unit is about 15° A.P.I. and represents approximately 13 liquid volume per cent of the crude. The vacuum tar is 13.5° A.P.I., with a 5 per cent distillation point above 900° F. (corrected from vacuum distillation) and a viscosity of 300 S.F.s. at 210° F., or 14,500 S.F.s. at 122° F. and represents 8 to 10 liquid volume per cent of the crude. Vacuum tar goes to the Dubbs unit for thermal cracking in a blend with syn tower bottoms and heavy cycle oil.

The vacuum gas oil is unusually clean and is excellent feedstock for the T.C.C. unit. An analysis of the vacuum gas oil showed a metals content of 0.1 p.p.m. nickel and 0.4 p.p.m. vanadium. The color is about 7 N.P.A. and the Ramsbottom carbon residue is 0.7 wt. per cent. The gas-oil is high boiling with a 50 per cent distillation point of 970° F. at 760 mm. (corrected from vacuum distillation) and has a gravity of 21° A.P.I.

The clean gas-oil make is charged to a small vertical-tube 5,000,000-B.t.u. per hour heater and then to the cat cracker as liquid feed. The liquid feed heater is of conventional Petrochem design, the convection section consisting of a finned-tube extension of the radiant tubes. All tubes are 5 per cent chrome steel. The gas oil to the liquid feed heater is on rate of flow control.

Catalytic Cracking

The T.C.C. air-lift principle has been described in a general way elsewhere.[1] The first units of this type were installed in 1950 at Magnolia Petroleum Co.'s. Beaumont, Tex., refinery.

Moving solid beds of catalyst are employed in the T.C.C. reactor and the kiln. Spent catalyst moves continuously from the reactor into the kiln. Here it is regenerated and then moves down into the lift pot from which it is carried up the lift pipe by air supplied by the lift air blower. The tapered lift pipe runs through the center of the kiln into the separator surge drum which provides a disengaging space for air and catalyst. The catalyst moves continuously by gravity from the separator surge drum into the reactor to complete the cycle.

Catalyst . . . A pelleted clay catalyst is used at the Phillips Okmulgee plant. Other existing T.C.C. units employ a beaded catalyst manufactured by Socony-Vacuum Oil Co., Inc., from a silica-alumina gel. The catalyst employed in the Okmulgee cat cracker is manufactured by Filtrol Corp. It is a sulfur-resistant activated kaolin-type clay catalyst. Nominal size of pellet is $\frac{1}{8}$ in. diameter by $\frac{1}{8}$ in. long. (Screen analysis shows 3 to 6 mesh for 97 per cent, minimum). Effective surface area of catalyst when new is 130-

140 sq. m. per gram or 55-60 sq. m. per gram for equilibrium activity catalyst, as measured by the nitrogen absorption method.

Steam seal . . . Pressures in the various vessels making up the T.C.C. air-lift system are about as follows: 2 psig. in the lift pot, substantially atmospheric in the separator surge tank, between 7 and 11 psig. in the reactor and several inches of water in the kiln. Since catalyst must move from a lower-pressure area in the separator surge drum to a higher pressure in the reactor, flow of catalyst is through a seal leg into which seal steam is introduced. The steam maintains a pressure amounting to some 10 in. of water above the reactor pressure so that hydrocarbon vapors cannot pass from the reactor up the seal leg into the separator surge hopper, or through the seal-leg vent.

Provisions have been made for automatic shutoff of catalyst valves, the liquid feed then bypassing the reactor in the event that: (1) there is insufficient seal steam, (2) catalyst void forms in the seal leg or head of reactor, due to catalyst bridging, or (3) reactor pressure is too high. If conditions make it necessary, vapor feed may also be temporarily bypassed.

Reactor effluent vapors are fractionated in the syn tower into: (1) e.p. gasoline and lighter overhead, (2) light cycle oil as side cut, (3) a heavy-cycle side stream which is usually all recycled to the furnace, and (4) a small stream of heavy oil off the bottom.

Tower construction . . . The syn tower is a 10-ft. i.d. by 65-ft. vessel with 26 fractionating trays and 1 well tray. All plates are designed for split liquid flow. The lower six trays and the well tray, which is between Plates 4 and 5, are stainless steel. The bottom three trays are split-flow, perforated pans. The next three trays are split-flow Glitsch trays. Trays 7 through 26 are standard Fluor bubble-cap trays of carbon steel with cast iron rectangular bubble caps. The lower 23 ft. 9 in. of the shell and the bottom head are stainless-steel clad.

Light cycle oil is taken off at Tray 12 (counting from bottom). Heavy cycle oil comes off at the well tray. A blinded nozzle is provided for future yield of cracked naphtha from Tray 22. A large quantity of tower bottom is circulated through the steam generator and returned to Tray 3 to remove superheat from vapor feed.

Rich sponge oil from the sponge absorber of the gas recovery plant returns to Tray 14. A side stripper removes light ends from the light cycle oil, making it suitable for use as absorption medium in the sponge absorber and for use as No. 2 heating oil.

2—GAS-CONCENTRATION PLANT

The new gas-recovery system at Okmulgee employs a deethanizer absorber. Employment of this unit in refinery gas recovery plants has been discussed previously.[2]

Deethanizing absorber . . . Operation of this unit has been predicted to recover 80-85 per cent propane fraction and substantially all butanes and heavier. Gas feed is on Tray 13 immediately above the stripping section. Unstabilized gasoline from the syn tower is absorption medium.

The top section of the deethanizer-absorber is 3 ft. in diameter by 55 ft. 3 in. and contains 27 Fluor standard bubble trays. The stripping section is 4 ft. 6 in. i.d. by 29 ft. 6 in. long containing 13 bubble trays. Connections are provided in the absorption section for intercoolers at Trays 16, 22, 28, and 34, designed for cooling streams from about 100° F. back to 90° F. The tower is designed to operate at 255 psi. and 270° F.

Heat input to the deethanizer-absorber reboiler is on a temperature controller operating from a thermocouple in the reboiler vapor line. The temperature controller resets a flow controller which controls flow of steam to the reboiler. Ethane and lighter is stripped out of bottoms product by reboiling, so that specification L.P.G. propane may be made off the poly unit without necessity of later deethanizing that L.P.G. product stream.

Sponge absorber . . . The gas from the top of the deethanizing absorber goes to the sponge absorber. Since unstabilized gasoline is used as absorption medium in the deethanizing absorber, some propane, butane, and gasoline fractions will be carried over. It is the function of the sponge absorber to recover them. Light cycle oil (employed as lean sponge oil) is fed to the top tray. The sponge absorber operates at about 225 psi. Rich sponge oil is therefore pressured back to the syn tower. Flow of rich sponge oil from the bottom is on level control. Pressure of both absorbers is held by a pressure controller operating on the dry-gas stream leaving the top of the sponge absorber.

Debutanizer . . . Bottom product off the deethanizer-absorber goes to the debutanizer, controlled by level on the reboiler. The debutanizer is a 30-tray column, fed on the sixteenth plate. Propane and butane fractions are cut overhead and the bottoms are debutanized gasoline. Bottoms are reboiled by a hot-oil reboiler. A temperature controller operating from a thermocouple in the reboiler vapor line regulates heat input through control of the amount of hot cycle oil circulated through the reboiler and back to the syn tower.

Hydrogen blistering . . . Hydrogen test probes are located in the syn-tower accumulator, the deethanizing absorber, and the debutanizer systems. Pressure gages on these probes will show pressure buildup if hydrogen penetration is occurring.

3—CAT POLY REVAMP

The catalytic polymerization unit was revised in anticipation of increased quantities of feed stock from T.C.C. unit operations.

The major revision was the replacement of four catalyst cases with a chamber-type reactor. The new reactor, which was made from equipment on hand, contains five beds or a total of 17,400 lb. of polymerization catalyst. All beds except the bottom bed are supported on a butterfly-type grid to facilitate spent-catalyst dumping. Provisions are made for temperature control of the individual beds.

The fresh feed from the T.C.C. unit is treated in the two-stage caustic feed treater, the primary washer for hydrogen sulfide removal and two secondary washers for mercaptan removal. The secondary treaters are paralleled with a caustic regenerator and a poly feed water washer. The treated fresh poly feed is combined with butane recycle, preheated by heat exchange with the reaction chamber effluent, and further heated in parallel coils in a 2,000,000-B.t.u. per hour gas-fired heater. The total feed from the heater is charged to the top of the five-bed reaction chamber. The reaction temperature is controlled by butane quench to each bed.

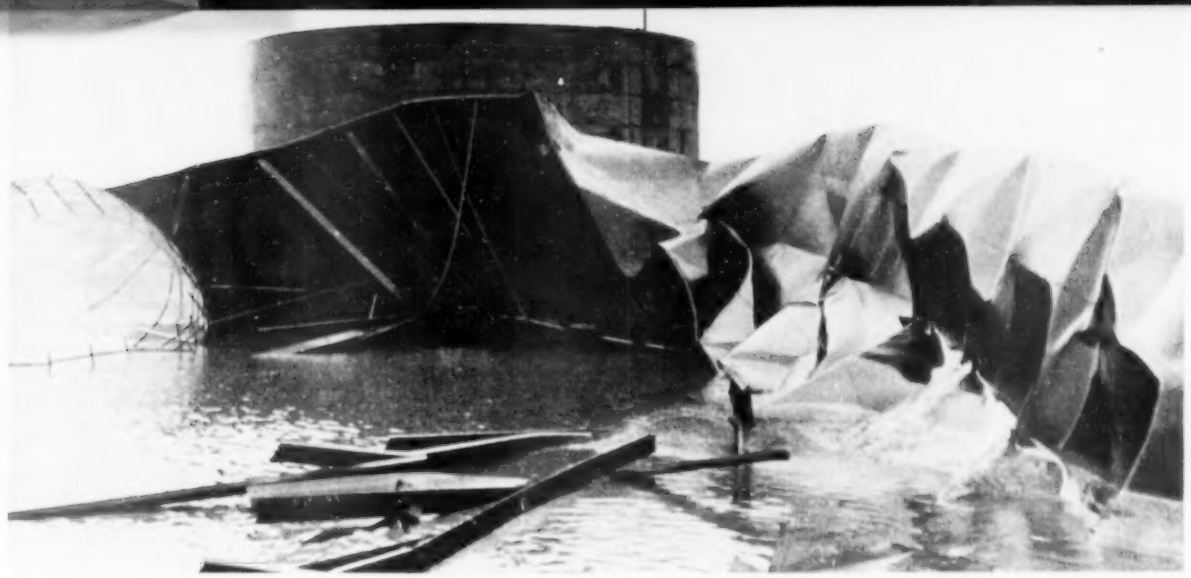
The effluent from the bottom of the reactor, after heat exchange with the total feed, is charged to a 35-tray depropanizer operating at approximately 300 psig. The bottom of the depropanizer tower is steam reboiled. The propane taken overhead is condensed and water removed by bauxite drying.

The depropanizer bottoms is charged to a 20-tray steam reboiled debutanizer operating at about 120 psig. The overhead butane is condensed, a portion circulated to the fresh feed, a portion circulated as quench to the reaction chamber, and the make yielded to L.P.G. The debutanizer bottoms make is polymer of about 3 psi. R.v.p. and is blended in motor fuel.

References

1. The Oil and Gas Journal, June 28, 1951, p. 66. Petroleum Refiner, September 1952, p. 110.

2. Bauer, R. D. and Gilmore, F. E., "Modern Trends in Refinery-Gas Extraction Plants," The Oil and Gas Journal, November 29, 1951, p. 84.



Two oil-storage tanks collapse in England during testing . . . precipitate study on . . .

WHY STORAGE TANKS FAIL

by F. J. Feely and M. S. Northup

EDITOR'S NOTE

This report concerns an investigation of two rather unusual tank failures which occurred in England about 2 years ago. Recently a fairly large number of tanks have failed in this country, and a study is now under way by an A.P.I. committee to determine causes. Since the war, there have also been a number of steel-plate failures in T-2 tankers in winter operation on the North Atlantic.

While the underlying causes of these various steel-plate failures are not fully understood at this time, there may exist some interrelation among them. Hence, this first report from England may prove a highly important contribution to the study of a problem which some observers consider a serious one.

The investigation shows:

- **In large-size tanks, with the type of steel used, defects in welding and failure to insure sufficiently high standards of welding can result in catastrophic failures.**
- **Both failures were started by welding defects of appreciable size.**
- **The British tank plate was entirely within the specification to which it was ordered. However, this steel cannot be relied upon to have sufficient notch toughness in plates of heavier thickness. A steel having better impact properties should be used.**
- **Inspection and inspection tools were insufficient to locate the gross initiating defects.**
- **Probe samples are undesirable because they do not adequately evaluate the welds and because their replacement provides opportunity for defects.**

IN February 1952 a large crude-oil tank in the Esso Petroleum Co., Ltd., refinery at Fawley, England, failed when being filled for water test. The failure was complete, the shell tearing completely away from the bottom and splitting into two parts. An investigation as to the cause of the failure was started immediately.

One month later a large gas-oil tank in the same refinery failed completely, also while being filled for a water test. This second failure intensified the study of the failures and the remedial measures necessary to assure the safety of these tanks in operation. This report covers these failures and the results of the subsequent investigation.

Description of Tanks

These tanks were ordered in accordance with A.P.I. 12-C specification amended to call for 100 per cent penetration of welding in all horizontal seams. Owner's inspectors followed the erection of these tanks in the same manner to the extent normally done by Standard Oil Co. (N. J.) affiliates. The fit-up of plate during erection was checked, the welding by qualified welders was inspected by the owner, and the required number of weld probe samples were examined to assure that the quality of welding was satisfactory.

The first tank failure occurred in the eleventh crude tank of identical design and of the same materials built by a British contractor. The other 10

SPECIFICATION OF TANKS THAT FAILED

	Crude storage tank	Gas-oil storage tank
Type	Floating roof	Cone roof
Size	140 ft. dia. by 54 ft.	150 ft. dia. by 48 ft.
Steel	B.S. 13	B.S. 13
Water height at failure	48 ft.	38 to 39 ft.
Filling rate	6 in. per hour	9 in. per hour
Water temperature	40° F.	40° F.
Air temperature	30° F.	47° F.

tanks have been in service and no trouble has been experienced with any of them. The second failure occurred in the sixth gas-oil storage tank built by a different British contractor.

The thickness of the plates in each of the tanks is tabulated below:

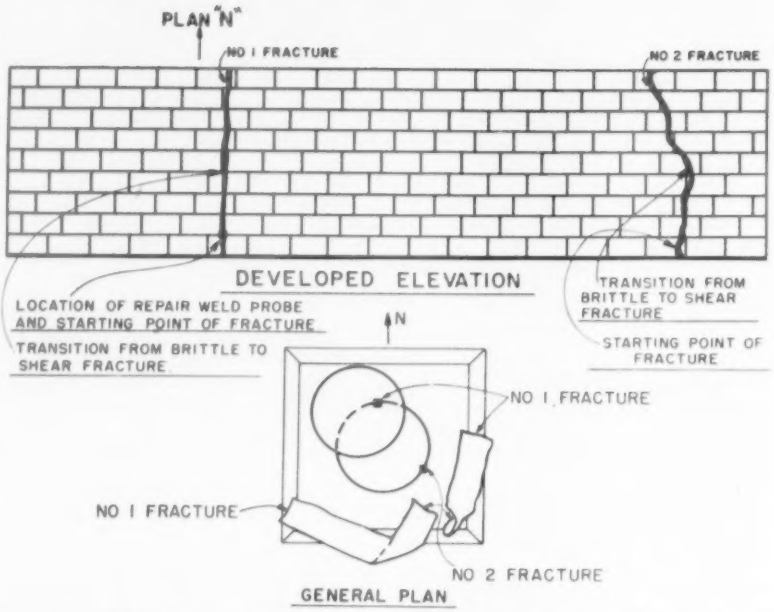
	Crude storage tank (in.)	Gas-oil storage tank (in.)
First course	35/32	33/32
Second course	31/32	29/32
Third course	27/32	25/32
Fourth course	23/32	21/32
Fifth course	19/32	1/2
Sixth course	15/32	3/8
Seventh course	3/8	1/4
Eighth course	1/4	1/4
Ninth course	1/4	...

Description of Tank Batteries

Crude storage . . . The first tank collapsed under a test head of about 48 ft. of water. As shown in the diagram, the tank shell split into two sections and washed out against the fire banks with the top of the shell lying toward the tank base center. The fractures in the shell were across the plates rather than at welds.

The force of the water tore the valve from a slop line in the adjacent street causing an oil spill. The stream coil line to an adjacent tank was pulled from the tank nozzle. The other pipe lines to the tank which were under construction at the time of the accident were severely damaged and had to be replaced. Some of these pipes were carried into nearby operating tank areas. Two fire hydrants were broken off at the base. Concrete pipe sleepers, welding machines, and other materials and equipment were also washed into operating tank areas but no damage to other tanks resulted. Two of the contractors' men assigned to watch the test were close by at the time of the accident. They suffered only slight injuries.

A month before the complete failure of this tank, a crack occurred in a weld probe replacement in the first horizontal joint. This crack was about 24 in. long and extended across the joint into the first and second-course plates. It took place when the tank was under test and contained 35 ft. of water. It was necessary to drain the tank and effect repairs. This repair was about halfway around the circumference from the final failure.



TANK SHELL split into two sections and washed out against the fire banks with the top of shell lying toward the tank base center. Fractures were across the plates rather than at welds.

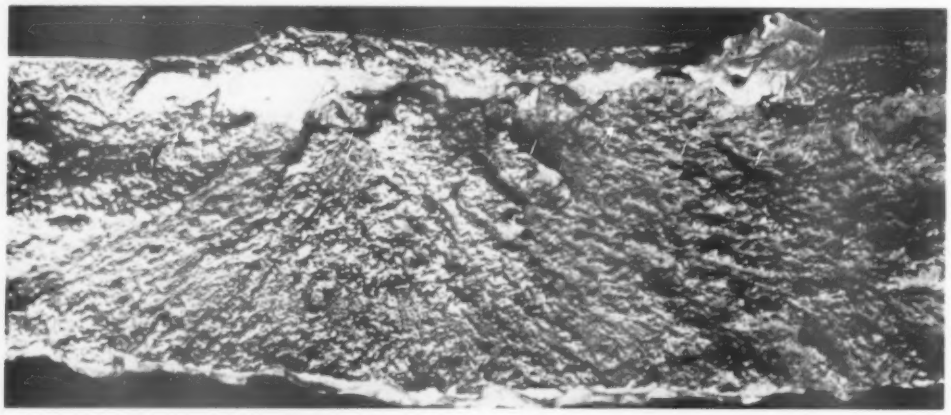
Gas-oil storage tank . . . The second tank failed while under test with a head of 28 to 39 ft. of water. This failure was similar in nature to the first failure. The shell split vertically, separated from the bottom and lodged on the fire walls. The shell did not break into two sections and opposite the point of failure, it remained attached to the cone roof. Accompanying is a general view of the tank following the failure.

Connecting piping was badly damaged, connections broken, and lines and sleepers carried considerable distances from the tank site and into adjacent operating areas. A fire hydrant was struck and broken off at its base.

In this tank cracks in welds and some lack of fusion had been found prior to starting the water test. All the defects reported were cut out and repaired under the supervision of the owner's inspector. These repaired areas did not fail when final failure occurred.

Investigation of Failures

Immediately following the collapse of each tank, an examination was made of all conditions surrounding the failures. The fractured edges were critically studied and examined for flaws or defects in the plate and weld metal. The main vertical fracture in each tank



WELDING FLAW where crude tank failure started. The replacement weld metal did not penetrate to the bottom of the groove. A single cover bead had been laid over the opening at the back of the probe location.

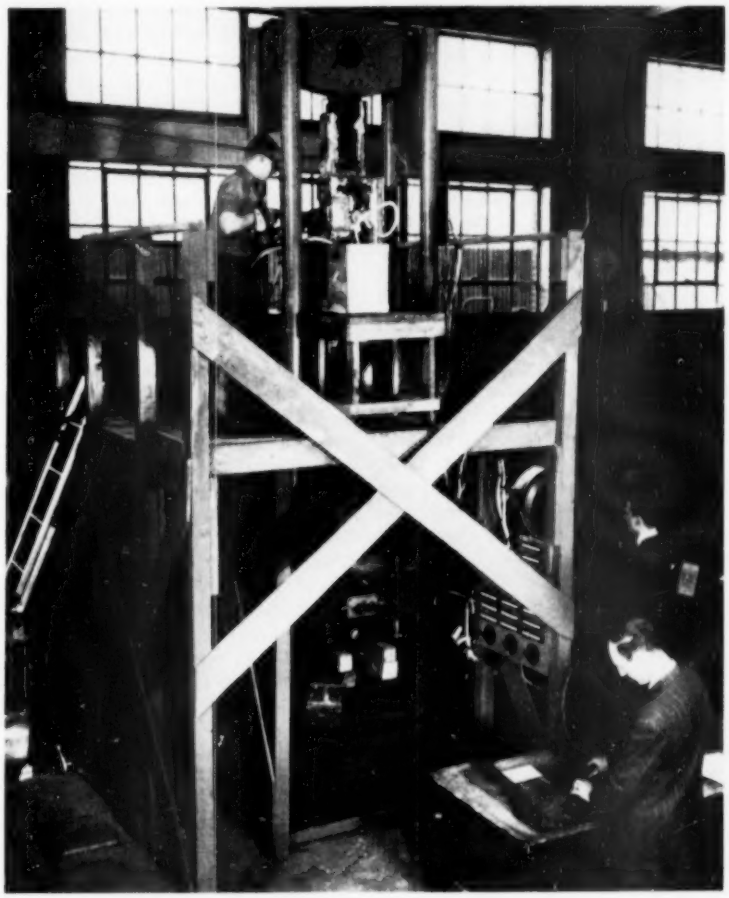
started at or near the horizontal joint between the first and second courses. This is the location of the maximum design stress in the shell.

Crude storage tank . . . In the crude storage tank the pattern of chevron markings definitely showed that the failure started at a weld probe replacement across the first horizontal joint. The crack progressed vertically in both directions, the plate failing in a brittle manner up to the fifth course where it changed to a shear type of failure. The thickness at this point was 19/32 in. The rupture was entirely within the plate material.

The weld probe where the fracture started is shown in an accompanying photo. The replacement weld metal did not penetrate to the bottom of the groove. A single cover bead had been laid over the opening at the back of the probe location. No back chipping was done to remove slag and provide a clean surface for the back weld. This procedure had left a void at the root where the weld metal had not been fused to the bottom of the probe hole. This void was about 2 in. long and at places extended for 20 to 25 per cent of the plate thickness. Probe saw marks and weld spatter were observed on the unfused surface proving that the void was of appreciable size. This defect is not the usual type found in welds such as porosity, slag inclusion, etc.

Gas-oil storage tank . . . The fractured plate edges of the second tank were, in general, similar to those of the first tank. The definite chevron markings showed that the fracture originated at a partially repaired crack in the top 10 in. of a weld in a vertical joint in the first course. This crack had extended about 2 in. into the second course plate. The surface of this old crack was coated with a black oxide film apparently formed during subsequent welding operation.

The final fracture progressed vertically in both directions. The steel failed in a brittle manner in the thicker plate and changed to a shear fracture in the fourth course where the thickness was 21/32 in. The rupture proceeded for the greater portion of its length through plate material rather than through welds. However, in the fifth course it traveled through a verti-



Engineers Seek Causes of Failures

Standard Oil Development Co. engineers are shown here experimenting on brittle properties of steel. Purpose of tests, begun a year ago and still under way, is to obtain information leading to design of failureproof petroleum tank structures. The testing procedure, developed by S.O.D.'s Esso engineering department, attempts to duplicate conditions in tanks which fail in brittle fashion. Steel specimens, varying from a few inches to 16 ft. or more in length, are used. A fine brittle crack—or notch—is made in the specimen at liquid nitrogen temperature. Steel piece is then loaded in a tensile testing machine where it is placed under constant stress and temperature conditions. Final step is shown above as a technician, using powerful impact gun, drives a hardened steel wedge into notch to learn if complete fracture will occur.

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cal joint. There was a serious lack of penetration throughout the length of this weld. A similar defect was observed in the fifth to sixth-course horizontal weld.

The old crack in the vertical weld from which the failure started had been partially but improperly repaired. In attempting to make the repair the crack had not been entirely chipped out before rewelding. Only a cover bead had been laid over the crack in the second course plate which extended almost through the full thickness of the plate.

Factors Involved in Failures

It became apparent soon after the investigation started that there were two separate factors to be considered in connection with these failures. First, the cause of the initiating cracks; and second, crack propagation in a brittle manner which resulted in these two catastrophic failures.

The initiating cracks in both tanks were established as the result of failure to insure a sufficiently high standard of welding. In the crude tank the faulty replacement of a weld probe sample and in the gas-oil tank the failure to properly repair a crack in a vertical weld were agreed generally to provide adequate explanation for the start of cracks at these locations.

These two serious failures were characterized by their suddenness, high speed of propagation, apparent brittleness of the heavier plate, and the fact that stresses were not abnormally high. They were similar in many respects to failures of welded ships and of several bridges. Therefore, the steel plate was examined to determine its properties with particular attention to its resistance to brittle fracture.

Tests on Tank Plate

Sections of plate were removed by both contractors for examination. Samples were forwarded to the United States for check tests. The chemical analyses and physical properties of plates are shown in Tables 1 and 2.

Impact Properties

Impact tests were conducted in England and in the United States on steel from both tanks. The results of these tests are given in the following tables. Table 3 covers the Izod and Charpy V and U notch test results on steel from the crude storage tank. Table 4 covers the Charpy V and U notch results on the gas-oil storage tank. Evaluation and comparison of these results are difficult; however, there are several criteria which can be applied.

1. The U. S. Government-sponsored ships-failure investigators have found that in all cases where brittle failures occurred the steel plate had Charpy V notch impact values of 10 ft.-lb. or below.

2. Tests on low-temperature properties of steels for service down to —150° F. have led to the conclusion that materials should give Charpy U notch impact values of 15 ft.-lb. or higher at the lowest operating temperature to insure against brittle failure.

3. The American Bureau of Shipping has used a similar standard for evaluating ship steel. They consider 20 ft.-lb. Charpy U notch as a satisfactory impact value at the operating temperature.

On the basis of these criteria it can be seen that the steel in both tanks was either close to or in the brittle range at the operating temperature of about 40° F. existing at the time of both failures.

Discussion

The investigation of these two tank failures has shown that, in large-size tanks, with the type of steel used, defects in welding and failure to insure a sufficiently high standard of welding can result in extremely serious consequences. It is doubtful if either of these failures would have occurred had the defects described earlier been absent. This emphasizes the need for better quality welding, closer supervision, and more intensive inspection.

The welders employed were paid on a footage rate which in itself does not promote the best workmanship. Radiographic examination has shown, also, that the full penetration of welds as required by the applying specifications was not being obtained. While one contractor had three inspectors following the work, the poor replacement of a weld probe did occur.

The other contractor had a welding foreman but no inspectors and a serious crack in a weld, a major defect, was left unrepaired. In addition, all of this welding was inspected by the owner. This latter inspection was done in the same manner and to the same degree as has normally been done for many years. It is obvious, however, that increased inspection can well be justified.

A.P.I. 12-C specifies the sectioning method for inspection of welds. In the case of these tanks, weld probes were removed by the contractors for this purpose and numbered about 35 per tank. A few defective welds were found by this method and necessary repairs made. However, this method did not prevent a gross defect in the welding in the gas-oil storage tank. Also, the unsatisfactory replacement of a probe sample in the crude storage tank pro-

TABLE 1—CHEMICAL ANALYSIS

	British Specification 13	First failure crude storage tank		Second failure gas-oil storage tank	
		First course	Second course	First course	Second course
Carbon		0.165	0.21	0.245	0.22
Silicon		0.015	0.02	0.04	0.05
Sulfur	0.06	0.036	0.041	0.027	0.03
Phosphorus	0.06	0.024	0.024	0.031	0.031
Manganese		0.54	0.56	0.62	0.54
Nickel		0.86	0.062	0.11	0.08
Chromium		0.02	0.02	0.05	0.05
Molybdenum		Trace	Trace	0.02	0.02
Copper		0.13	0.12	0.13	0.13
Vanadium		Trace	Trace		
Arsenic		0.030	0.068		

TABLE 2—PHYSICAL PROPERTIES

	Yield strength (psi.)	Ultimate strength (psi.)	Elong. per cent in 8 in.	Red. of area (per cent)
B.S. 13:				
First course		58–71,500	20	
Second course		62–74,000	20	
Crude storage tank:				
First course:				
Longitudinal	31,400	59,600	31.0	60.4
Transverse	(*)	58,500	28.0	39.6
Second course:				
Longitudinal	33,400	65,800	26.5	56.0
Transverse	(*)	64,500	26.5	53.4
Gas-oil storage tank:				
First course:				
Longitudinal	30,400	68,100	38.0	57.0
Transverse	31,400	70,200	37.0	58.0
Second course:				
Longitudinal	37,000	66,100	34.0	56.0
Transverse	35,800	65,400	38.0	58.0

*No marked yielding for these specimens.

vided the trigger action which resulted in complete failure.

It was noted that some weld probes were not cut deeply enough particularly in the thicker plate to show the root condition of welds. It is possible, therefore, that lack of penetration, present even where such probes were removed, could not be picked up by the inspector. A better means of weld inspection is necessary and radiography offers the best solution to the problem.

Radiographic inspection carried out at Fawley since the failure using both X-ray and gamma ray has revealed lack of penetration under bead cracking and inclusions. In view of these findings and the reported cracking found in tanks at other locations, it is apparent that this better inspection tool should be used to assure that crack initiating defects are absent in welded tank joints.

The brittle fracture in steel has been a subject of study for many years. However, it has been only in recent years that much attention has been paid to it in connection with ordinary mild steel. Many tests have been devised to study this phenomena, the most common of which have been a variety of impact tests. Studies have shown that brittle failures occur in two stages.

First, a crack must be started, usually from a notch effect of some sort, and second, this initial crack must propagate at high speed through the steel. It has been fairly well established that a high stress is usually present when the crack initiates.

This is readily understood when one considers that a sharp notch, a crack of sharp-cornered metal discontinuity constitute serious stress raisers. This condition prevailed in both failed tanks.

The phenomenon of the crack propagation is difficult to explain. Numbers of cracks have started in welded structures, extended short distances and stopped. In others, as in the cases of some welded ships and these two tanks, the cracks have continued and resulted in catastrophic failures.

The impact tests made on the steel from the Fawley tanks which failed indicate that the plate in the lower courses was in the transition range at the operating temperature of 40° F. (approximate). Actually the brittle nature of the failures themselves is proof of this.

TABLE 3—IMPACT VALUES—CRUDE STORAGE TANK

	Izod value in ft.-lb. at temp. °F.		
	4	25	68
First course:			
Longitudinal	7, 8	12.5, 16	36, 44
Transverse	5, 5	8.5, 10	29, 32
Second course:			
Longitudinal	6, 8	7.5, 8.5	30, 34
Transverse	4, 5	7, 7.5	35, 42.5
Fifth course:			
Longitudinal	16	41, 45	36, 47
Transverse	10, 15	25, 30	33, 33

	Charpy V notch value in ft.-lb. at temp. °F.			
	4	32	50	68
First course:				
Longitudinal	3, 3	6, 7	6, 12	19, 30
Transverse	3, 4	3, 5	5, 9	18, 21
Second course:				
Longitudinal	4, 5	5, 9	10, 15	15, 22
Transverse	3, 5	5, 5	5, 5	12, 13
Fifth course:				
Longitudinal	7, 9	16, 20	17, 21	40, 45
Transverse	7, 7	14, 15	15, 17	34, 38

	Charpy U notch value in ft.-lb. at temp. °F.			
	0	30	50	68
First course	5, 5, 4	13, 12, 8	20, 26, 15	31, 30, 29
Second course	5, 5, 5	15, 17, 10	18, 22, 21	21, 25, 23
Fourth course	14, 5	25, 25, 27	26, 29, 27	20, 22, 28
Fifth course	6, 12, 7	21, 23, 24	28, 29, 27	30, 22, 28

TABLE 4—IMPACT VALUES—GAS-OIL STORAGE TANK

	Charpy V value in ft.-lb. at temp. °F.			
	—4	—32	68	104
First course:				
Longitudinal	7, 7	10, 6	27, 18	45, 44
Transverse	3, 4	10, 8	22, 21	30, 30
Second course:				
Longitudinal	4	6	20	30
Transverse	4	8	9	30

	Charpy U notch value in ft.-lb. at temp. °F.			
	—4	—32	68	104
First course	7, 5, 11	20, 25, 18	27, 27, 27	26, 30, 30
Second course	4, 7, 4	15, 7, 6	21, 17, 11	23, 22, 24

The bulk of experience with brittle fractures has been in the ship industry where A.S.T.M. A-7 was used. Investigation of ship failures revealed that A.S.T.M. A-7 steel may be susceptible to brittle fracture over a wide range of temperatures. The ship-failure investigators also found that thicker plate was more subject to brittle fracture than thinner plate.

As a result of extensive laboratory investigations they established a specification calling for a fully killed steel manufactured to fine-grained practice for heavier thicknesses. This steel is stated to have better impact properties and is believed to be less subject to brittle fracture at normal operating conditions. It is sold under the name of A.B.S. (American Bureau of Shipping) Class C.

In England, Lloyd's Register of Shipping has surveyed steel-plate production and prepared its specification P-104. This is a general specification covering thick plate for ship construction. It does not give specific requirements to assure notch toughness. It does require that melting practice be approved and that test lots of steel made by such practice be tested by some form of impact test. Lloyd's examines the data and approves the steel. Subsequent tests of heats are not made but a Lloyd surveyor follows production to see that there are no deviations from the approved practice.

We have concluded that these steels are the most satisfactory until such time as more is known about the problem.

Conclusions

This study on the failure of oil-storage tanks has disclosed that:

1. Defects in welding and failure to insure sufficiently high standards of welding can result in catastrophic failures in large tanks, when British tank-plate steel or equivalent is used in construction of the tanks.

2. Failures on both tanks considered in this study were started by welding defects of appreciable size.

3. British tank plate, Type B.S. 13, used in constructing the tanks was entirely within the specification to which it was ordered. However, this steel cannot be relied upon to have sufficient notch toughness in plates of heavier thickness. A steel having better impact properties should be used.

4. Inspection procedures and inspection tools were insufficient to locate the gross initiating defects.

5. Probe samples are undesirable for testing in this application, since they do not adequately evaluate the welds, and because their replacement provides opportunity for defects.

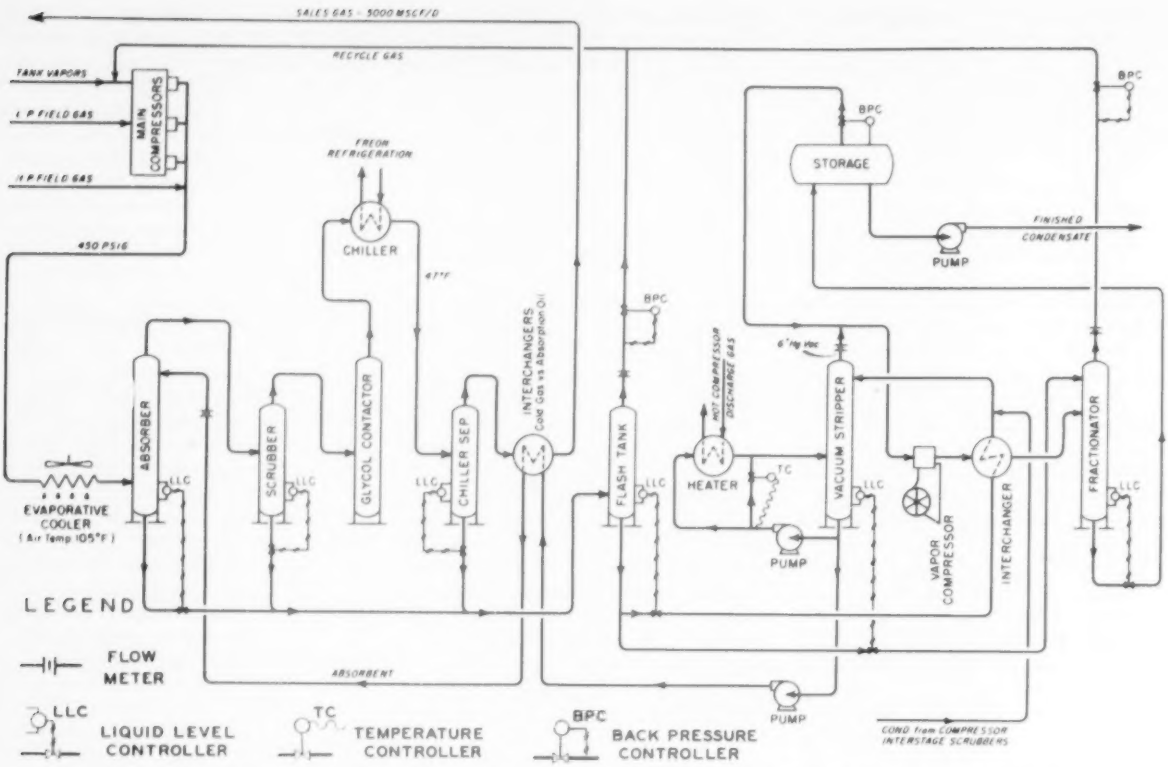

Fig. 1—Process flow diagram of McKittrick refrigerated condensate extraction plant of Union Oil Co. of California.

Condensate Extraction by Refrigeration

. . . a low-investment means of processing natural gas to obtain a reduced extraction of liquid components

by D. E. McFaddin

DEVELOPMENTS in gas dehydration and the availability of standardized refrigeration units at low cost have in the past few years extended the working range of processing of natural gas into the low temperature or "subhydrate" range. Some of our old timers report an attempt was made some 50 years ago to operate expander-type gasoline plants at low temperature and some degree of success was achieved by resorting to daily or periodic thawing of hydrates and ice.

Subsequent development of the conventional absorption cycle forced these old refrigerated processes out of existence. Recently, however, several large refrigerator-type plants have been built in the Mid-Continent, one of which operates at as low as —100° F. Also, small units have been developed to operate at around 20° to 40° F.

One small unit was constructed in 1951 at West Mountain, south of Santa Paula, Calif. This plant was designed to operate on about 700 M.c.f. per day of 500-psig. dehydrated compressed gas and to obtain a degree of condensate extraction by simple refrigeration to 30° F. Refrigeration in this unit is achieved by a small propane unit, and also by throttling the gas from 500 psig. to 350 psig. Interchange of heat between the input and discharge gas is utilized to reduce the refrigeration requirements. This installation effectively recovers pentanes and heavier components, but leaves a relatively high content of butanes in the discharge gas.

Gasoline absorbent . . . Another type of low-temperature extraction plant was constructed last year in the Belgian Anticline field near McKittrick, Calif. This plant was designed to utilize vacuum-stripped gasoline ends as an absorbent in conjunction with refrigeration obtained from a freon unit. The basic idea of the process is to extract butanes and some pentanes from the gas by absorption at 400 psig. and atmospheric temperatures and then refrigerate the gas at temperatures ranging from 30° to 50° F. to reduce the residual content of the hexanes and heavier fractions as well as to further reduce the pentane and lighter components. The fundamental advantages of such a process were hoped to be as follows:

1. Utilization of waste heat from the compressor discharge gases; in order to eliminate heater fuel, this to be feasible by stripping gasoline ends under vacuum.

2. No steam boilers; so that the

Author associated with Union Oil Co. of California. Paper presented at fall meeting, C.N.G.A., 1953.

TABLE 1—COMPARISON OF OPERATING COSTS AND RETURNS FOR NATURAL-GASOLINE EXTRACTION FACILITIES EXCLUDING STABILIZATION AND GAS LINES AND COMPRESSION TO AND FROM EXTRACTION UNITS. ALSO NOT TAKING INTO CONSIDERATION ROYALTIES, DEPRECIATION, INTEREST, INCOME TAXES AND PROFIT, NOR COST OF FINDING AND DEVELOPING GAS AND OIL

Basis: (1) 5,000 M.c.f. per day gas rate treated; (2) wet gas available at 450 psig.; (3) isobutane and heavier content of gas to extraction units = 0.9 gal. per M.c.f.

	A Simple refrigeration of gas		B Refrigeration combined with absorption, utilizing vacuum stripped gasoline ends as the absorbent		C Simple absorption employing high temp. stripping (fired heater)
Type of plant—					
CASES (various extraction efficiencies depending upon process design):	1	2	1	2	1
Isobutane and heavier fractions in plant discharge gas, gal. per M.c.f.	0.7	0.6	0.45	0.3	0.1
Net extraction of isobutane and heavier components, gal. per M.c.f.	0.2	0.3	0.45	0.6	0.8
Net extraction of isobutane and heavier components from 5,000 M.c.f. per day, gal. per day	1,000	1,500	2,250	3,000	4,000
Value of isobutane and heavier extracted components at 10 cents per gal., dollars per day	100	150	225	300	400
EXPENSES:					
Compression required for recycled vapors, hp.	15	20	100	110	110
Compression required for vacuum stripping, hp.			60	80	
Compression required for refrigeration, hp.	70	90	70	90	
Total hp.	85	110	230	280	110
Compression fuel at 270 s.c.f. per hp. day, M.c.f. per day	23	30	62	76	30
Gasoline shrinkage at 30 cu. ft. per gal. = 85 per cent iC_5+, M.c.f. per day	35	53	79	106	141
Heater fuel at 3.5 per cent of 5,000 M.c.f. per day gas throughput, M.c.f. per day					175
Miscellaneous: pumping, dehydration fuel and losses, M.c.f. per day	30	30	40	40	60
Total fuel and shrinkage, M.c.f. per day	88	113	181	222	406
Value of fuel and shrinkage at 17 cents per M.c.f., dollars per day	15	19	31	38	69
RETURNS AFTER FUEL AND SHRINKAGE, dollars per day	85	131	194	262	331
OPERATING AND MAINTENANCE EXPENSE:					
Compressor maintenance at 2 cents per hp. day, dollars per day	2		5		2
Refrigeration equipment maintenance at 4 cents per hp. day (add to compr.), dollars per day	3		3		
General maintenance and operating labor (time shared with other duties), dollars per day	15		40		50
Materials and supplies, dollars per day	10		20		30
Miscellaneous: laboratory, electricity, water, etc., dollars per day	3		5		6
Subtotal, dollars per day	33		73		88
Supervision, overhead, taxes, and insurance at 60 per cent above subtotal, dollars per day	20		44		53
Total expenses, dollars per day	53		117		141
NET RETURNS, dollars per day	32	78	77	145	190

TABLE 2—COMPARISON OF CAPITAL EXPENDITURES REQUIRED FOR NATURAL-GASOLINE EXTRACTION FACILITIES (EXCLUDING STABILIZATION AND GAS LINES AND COMPRESSION FACILITIES TO AND FROM EXTRACTION UNITS)

Basis: (1) 5,000 M.c.f. per day gas rate treated; (2) wet gas available at 450 psig.; (3) isobutane and heavier content of gas to extraction units = 0.9 gal. per M.c.f.

ITEMS (appurtenances and adjacent piping included)—	A Simple refrigeration of gas	B Refrigeration combined with absorption, utilizing vacuum stripped gasoline ends as the absorbent	C Simple absorption employing high temp. stripping (fired heater)
Refrigeration unit: 40-ton capacity, air-cooled, gas-engine powered	$24,000	$24,000	
Cooler—Evaporative type	8,000	10,000	$20,000
Gas coolers	5,000	8,000	5,000
Oil coolers			5,000
Gasoline condenser			8,000
Heat exchangers	8,000	16,000	24,000
Direct-fired heater (2,500,000 B.t.u. per hour capacity)			15,000
Agitation steam generator			5,000
Absorber		15,000	17,000
Vacuum stripper		9,000	
Still			30,000
Reflux or primary condenser			15,000
Vent tanks, reabsorbers, reflux accumulators, etc.	3,000	15,000	20,000
Vacuum compressors for stripping absorption gasoline ends		24,000	
Gas dehydrator	10,000	10,000	8,000
Absorption-oil cleaning unit			6,000
Process and shipping pumps	1,000	6,000	12,000
Gasoline storage	8,000	12,000	14,000
Total capital expenditure required for extraction units	$67,000	$149,000	$204,000

TABLE 3—COMPARISON OF PAYOUT TIME FOR NATURAL-GASOLINE EXTRACTION FACILITIES (EXCLUDING STABILIZATION AND GAS LINES AND COMPRESSION FACILITIES TO AND FROM EXTRACTION UNITS)

Basis: (1) 5,000 M.c.f. per day gas rate treated; (2) wet gas available at 450 psig.; (3) isobutane and heavier content of gas to extraction units = 0.9 gal. per M.c.f.

Type of plant—	A Simple refrigeration of gas		B Refrigeration combined with absorption, utilizing vacuum stripped gasoline ends as the absorbent		C Simple absorption employing high temp. stripping (fired heater)
CASES (various extraction efficiencies depending upon process design):	1	2	1	2	1
Isobutane and heavier fractions in plant discharge gas, gal. per M.c.f.	0.7	0.6	0.45	0.3	0.1
Net extraction of isobutane and heavier components, gal. per M.c.f.	0.2	0.3	0.45	0.6	0.8
Net extraction of isobutane and heavier components, gal. per day	1,000	1,500	2,250	3,000	4,000
CAPITAL EXPENDITURE REQUIRED FOR EXTRACTION UNITS (from Table 2)	$67,000		$149,000		$204,000
Less Type B	.....				149,000
Amount C is greater than B	.....				$55,000
Less Type A	.....		67,000		
Amount B is greater than A	.....		$82,000		
NET RETURNS (from Table 1), day	$32	$78	$77	$145	$190
Less B-2	.....				145
Amount C is greater than B-2	.....				$45
Less A-2	.....			78	
Amount B-2 is greater than A-2	.....			$67	
PAYOUTS:					
Time required for net returns to equal capital expenditures, years	5.7	2.4	5.3	2.8	2.95
Time required for incremental returns to equal incremental capital expenditures, years	.....			3.35	3.35

TABLE 4—TYPICAL ANALYSIS OF SAMPLES TAKEN FROM PLANT AT BELGIAN ANTICLINE FIELD, McKITTRICK, CALIFORNIA

Component—	Wet gas to extraction units (compr. condensate excluded)*		Simple refrigeration, 450 psig. - 35° F. discharge gas*		Refrigeration combined with absorption utilizing vacuum stripped gasoline ends as the absorbent: Discharge gas test No. 1		Discharge gas test No. 2		Liq. vol. % Absorbent gaso. ends	Liq. vol. % Raw gaso. prod.†	Est. extr. gasoline gal./day
	Mole %	G./M.c.f.	Mole %	G./M.c.f.	Mole %	G./M.c.f.	Mole %	G./M.c.f.			
Methane, CO_2, air	89.38		90.10		90.73		90.46				
Ethane	4.82		4.73		4.97		4.92			0.33	
Propane	3.25		3.11		3.05		3.92		0.05	11.50	
Isobutane	0.46	0.151	0.42	0.138	0.22	0.072	0.23	0.075	0.59	9.81	460
n-Butane	1.22	0.385	1.09	0.344	0.44	0.139	0.51	0.161	3.15	33.99	1,350
Isopentane	0.29	0.106	0.23	0.084	0.17	0.062	0.17	0.062	2.72		270
n-Pentane	0.26	0.094	0.19	0.069	0.14	0.051	0.15	0.054	3.55	44.37	240
Hexanes and heavier	0.32	0.132	0.13	0.053	0.28	0.115	0.27	0.111	89.94		130
Total											2,450
Total isobutane and heavier		0.868		0.688		0.439		0.463			
Total isopentane and heavier		0.332		0.206		0.228		0.227			640
Gravity, °A.P.I.	.....								58.7	90.1	
R.v.p.	.....								4.6	50.6	
Rates, M.c.f. per day	.....				7,930		5,950				
Gal. per day	.....								43,600	16,950	

*This analysis obtained by operating the plant as a single refrigeration unit. †Raw gasoline includes an undetermined quantity of compressor condensate estimated at 4,500 gal. per day.

plant could be operated unattended.

3. Low first cost.

Plant comparison . . . Table 1 gives a comparison of these two types of plants, together with that of a conventional small absorption plant. The values presented here are not actual data of a particular plant for a particular period, but have been adjusted to a comparable basis so as to be representative of typical conditions that may be encountered in California. Two cases of extraction efficiency are shown under Types A and B. The extractions reduced from the 0.45 gal. per M.c.f. of Case 1 have been actually achieved test result to 0.35 by reducing the and substantiated by tests, as indicated temperature to which the absorber dis- in Table 4, while those of Case 2 have charge is chilled from the 47° F. value not been actually achieved, but are be- represented by the test to 27° F. This lieved to be possible after modifying is possible without increasing the re- the present processes. frigeration load merely by precooling

A correlation of test data from the McKittrick plant indicate that the iso- butane and heavier content of the dis- charge gas of Type B plant can be reduced from the 0.45 gal. per M.c.f. of Case 1 have been actually achieved by reducing the temperature to which the absorber charge is chilled from the 47° F. value to 27° F. This is possible without increasing the refrigeration load merely by precooling

(Continued on page 82)

NATURAL-GASOLINE POINTER

Packaged Compressor Plants

. . . not just a compressor on a skid, but a complete factory-assembled unit, compact enough to be transported on an oil-field truck. Here's how they are making worth-while savings.

by E. S. McRoberts

THIS discussion of packaged compressor plants refers only to the heavy-duty, direct-connected gas-engine-driven compressor plants. These units, which vary from about 110 hp. to 550 hp. in size are sometimes referred to as skid-mounted compressors. However, there is a big difference between a skid-mounted compressor and a packaged compressor plant. The first is a compressor and radiator mounted on a skid, while the second is just what the name implies, a complete packaged plant with its compressor, cooling equipment, lubricating system, all its manifolds, piping and scrubbers, and air starting system assembled in the factory on a rigid fabricated steel base and equipped with a number of additional automatic safety controls to eliminate the need for full-time operators. Here is a real packaged compressor plant.

Applications

These packaged compressor plants have a variety of applications in oil and gas production as well as in other fields. As the compression end of each one is individually designed, they can be adapted to any use where gases, vapors, or air must be compressed.

In the gas-distillate fields the gasoline plants have steadily increased the absorber pressure for higher efficiency. The high-pressure wells in these fields feed into the gathering system at a relatively high pressure and flow into the absorber without additional compression. The gathering lines are small and are designed to handle this high pressure.

Falling pressures . . . When the field pressure begins to fall, some of the wells will not flow into the gathering system and others will have their flow sharply reduced. At this point it is necessary for the operators and producers to make a decision as to the best method of handling the gas from these wells. Actually, only two alternatives are available.

One, is to lower the pressure on the gathering system and install compressors in the gasoline plant itself. If this method is chosen all of the gas to be processed through the plant will require compression up to absorber pressure although only a small percentage actually requires it.

The high-pressure gathering system will also require considerable revamping as the small lines originally designed to carry a given volume of high-pressure gas will not handle the same volume at the lower pressure. This calls for a large capital investment.

Boosters . . . It is far more economical for the producer to install a field compressor to boost the gas from the low-pressure wells into the present gathering system. The packaged compressor plant is ideally suited for this application, as it can be installed first as a single-stage compressor to take suction at slightly below the line pressure and then follow the pressure down as low as it is feasible to operate single stage. When the well pressure has reached this minimum condition, one additional compressor cylinder can be added, together with a gas intercooling coil, second-stage scrubber, and a small amount of piping and the operation continued as far as two-stage compression is practical.

Field installation . . . These changes can be made in the field very economically for the simple reason that, in the basic design, provision was made for the additional equipment required. Thus, with the exception of the additional compressor cylinder the change can be made at no more expense than if the plant had been purchased as a two-stage unit originally.

Portable . . . Another large saving is effected because less over-all compressor horsepower will be required to deplete the field. As the first wells to require compression are abandoned, and this usually occurs long before the entire field is abandoned, the compressors can be moved to other wells and reused. This move can be made very economically because the flat concrete slab foundation is the only item that cannot be reused.

For this application the packaged compressor plant offers two outstanding savings: (1) less total horsepower required, and (2) no change in the gathering system.

Compressing Separator Flare Gas

A second application of the packaged compressor plant is in the gathering of flare gas in the oil fields to be processed in the gasoline plant. Here we have a low-pressure gas from the start that must be boosted to the absorber pressure. Under the old system the compressors would be installed in the plant and large low-pressure gathering lines laid into the field.

With a 1,000-psi. absorber pressure and a separator pressure of around 15 psi., three stages of compression will be required. The compressor horsepower required for an installation of this type will be approximately the same for field compressors as for a central station at the plant.

Consideration should be given, however, to the use of semiautomatic packaged compressor plants in the field for the first two stages of compression boosting the 15-psi. gas to approximately 275 psi. and installing the third and final stage of compression at the plant. With this arrangement many tons of steel can be saved in the gathering system, as well as a great deal of cost in laying and wrapping the lines. A safe rule-of-thumb figure is from 40 to 50 per cent actual saving in dollars on the installed gathering system. In a field of any size this means a very large saving.

For this application two definite savings can be shown: (1) approximately a 50 per cent reduction in pipe required and (2) large savings in the cost of laying the pipe.

On Packaged Gasoline Plant

A third application of the packaged compressor plant in the natural-gasoline industry is in conjunction with the packaged gasoline plant.

Since these plants are relatively small, and generally installed in small fields, a packaged compressor plant can be designed and built to handle all of the compression requirements with one or two units.

As an example, three stages of gas compression, propane-refrigeration compression, and recycle vapor compression can all be handled on one 550-hp. packaged compressor plant.

The advantage of having all of these

Author is manager of compressor sales, J. B. Beaird Co., Inc., Shreveport, La. Paper given at N.G.A.A. regional meeting at Tyler, Tex., October 23, 1953.

services in one compact unit completely manifolded and piped requires no further explanation.

Other Savings

In addition to the general savings listed, the lower installed cost per horsepower of the packaged compressor plant must be considered. In these applications, as in gas lift, repressuring, etc., the competently engineered, factory - production-line-manufactured packaged compressor plant costs less to buy, is cheaper to install, and saves weeks of time in getting on stream.

After the packaged compressor plant is installed, automatic controls take over the operation, regulate the speed of the compressor to meet the demand, and in general relieve the operator for other duties.

Hundreds of installations offer definite proof of the lower installed cost, lower maintenance and operation costs, and the high availability of the semi-automatic packaged compressor plant.

To summarize a packaged compressor plant is a complete plant—it's fully assembled in the factory—it's compact enough to be transported on oil-field trucks. It's adaptable to any use where gas or air must be compressed. Whether used as single units or in large banks of many units, it has been found to reduce the cost of installation and to save on maintenance expense.

Condensate Extraction By Refrigeration

(Continued from page 80)

the dry gas to 65° F. in the present evaporative cooler before dehydration. Needless to say, this change is being made at McKittrick. Further increase in extraction of isobutane and heavier fractions is indicated to be possible by better vacuum stripping of the absorbent which Table 4 indicates contains slightly more than 10 liquid volume per cent of n-pentane and lighter fractions.

A large fractionating column with reflux condensation and a high reboiler load would be required to eliminate all the pentanes and could probably not be justified in comparison to a conventional absorption plant. An engineering study is required to determine the optimum process design and operating conditions; however, test data indicate that Case 2 efficiencies can be met, and possibly exceeded, by only minor changes.

In a similar manner, the recovery of isobutane and heavier fractions by simple refrigeration of Type A plants is markedly affected by the gas composition and the method of processing the hydrocarbon condensate formed during compression intercooling and after cooling. Case 2 of Type A is based upon effectively utilizing such condensate as an absorbent by separating it from any water that may form and then commingling it with the dehydrated gas into the chiller. Case 2 of Type A differs from Type B by having no absorber, vacuum compressor, or vacuum stripper, and therefore, the recovery of gasoline fractions will be less than of Type B plants, but, as indicated by Table 3, will give the shortest payout.

The heater fuel for Type C exceeds the compressor fuel required for refrigeration and vacuum stripping of Type B Case 2 by 175 — (76 — 30) = 129 M.c.f. per day, which at 17 cents per M.c.f. indicates a fuel saving of $22 per day resulting from the utilization of low-level waste heat in the Type B plant. However, after deduction of compressor maintenance expense, this saving is of secondary importance compared to the greater extraction efficiency of Type C.

Estimated costs . . . The estimated capital expenditures of Table 2 are admittedly subject to adjustment in accord with design and standards of construction. For example, simple absorption package units modified to operate without steam stripping in the still are available at roughly half the $204,000 indicated in the table. Conversely, independent estimates for a custom-built permanent - type conventional absorption plant have been obtained which are 50 per cent greater than the $204,000 found in Table 2.

Similarly, by using electric power and evaporative cooling, instead of the gas-engine power and dry-air cooling used at McKittrick, the cost of the refrigeration unit for Types A and B may be reduced $4,000 to $6,000. Several standardized refrigeration units suitable for these requirements are available from reputable manufacturers, which should assure satisfactory operation and service. In general, all three plant types of Table 2 may be considered deluxe custom-built models, without chrome trim, but designed to operate with maximum safety at a low cost.

It should also be emphasized that these units were designed to operate in the McKittrick climate where 105° F. is common in the summer time. It is intended that the values assigned to the three types of plants in Table 2 be consistent with the extraction and operating expenses of Table 1. The values are itemized according to units complete with all necessary foundations, appurtenances, painting, insulation, instruments and piping, and including engineering and contractor's fees. The justification of each unit can thereby be checked and compared with possible alternatives.

Payouts . . . The payouts indicated in Table 3 are of the abbreviated variety. That is, they do not include such major items as the cost of finding and developing the gas, which may or may not be associated with oil. Table 3 shows that the refrigeration types of plants do not appear attractive compared to the conventional absorption plant for Case 1 representing actually achieved extractions. However, they may become attractive if the extractions of Case 2 are achieved and which are believed to be attainable with minor changes.

The typical analyses of Table 4 reveal the particular characteristics of the refrigerated processes. For example, combining vacuum-stripped gasoline as an absorbent, together with refrigeration, effectively increased the recovery of butanes, but simple refrigeration gave a higher recovery of hexanes and heavier. Consequently, justification of Type B plants will depend upon relative values of butanes and hexanes. These were arbitrarily considered of equal value in this study in order to simplify the variables.

The data obtained thus far on the refrigerated gasoline - extraction processes in California reported herein indicate that they are worthy of consideration as a means of recovering natural-gasoline fractions from natural gas where capital expenditures must be kept to a minimum and where life of the project may be short.

Simple refrigeration does a fair job of recovering pentanes and heavier fractions, while refrigeration combined with absorption, utilizing vacuum stripped gasoline ends as the absorbent, may be advantageous where the recovery of butanes and lighter is required. Gases rich in butanes (and propane if it has adequate value) consequently favor this process.

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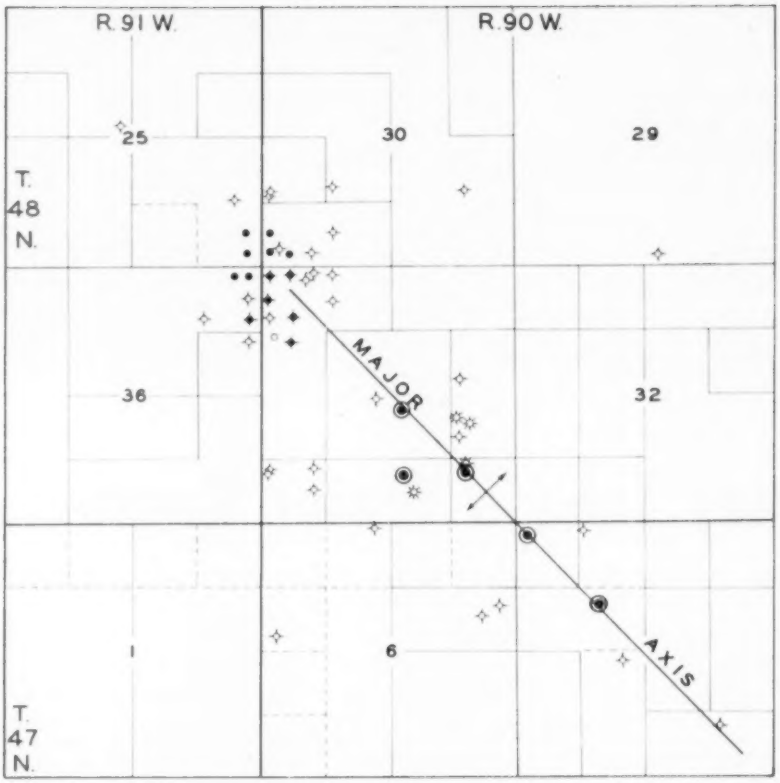


HIDDEN DOME, an elongate, asymmetrical anticline on the east limb of Big Horn basin in western Wyoming. Tensleep sandstone oil wells producing an unusual reservoir crude are circled.

Hidden Dome Yields 270-Cp. Viscosity Oil at 4,500 Ft.

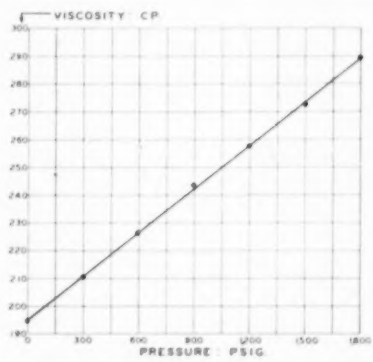
by Joseph A. Kornfeld
District Editor

GOOD crude recoveries from a high-viscosity reservoir oil has been obtained since 1946 from the Tensleep reservoir at Hidden Dome field, Washakie County, Wyoming. Tensleep crude produced at Hidden Dome is unusual in that the viscosity of the crude is about 270 cp. at a depth of about 4,500 ft. Generally, reservoir oils exhibit viscosities from less than 1 cp. to a few centipoise. Hidden Dome lies 15 miles northeast of the town of Worland on the east side of the Big Horn basin.

Cumulative recovery has been 530,000 bbl. of oil from five Tensleep wells which is an average of 106,000 bbl. per well. Produced gravities are low and average 19.8° A.P.I.

Pumping Problems

Viscous character of the Tensleep oil has presented many pumping problems. Due to low fluid levels, pumps must be set in the wells near total depth. Thus this fluid level requires that all fluid be lifted from the bottom of the well.



VISCOSITY-PRESSURE relationship varies from 290 cp. at 1,800 psig. original reservoir pressure, to 195 cp. at 0 psig.

Frequent rod breakage . . . Rod breakage was an extremely frequent occurrence during the first several years of operation following discovery of Tensleep reservoir in 1946. In an attempt to solve this problem, Ohio Oil Co. engineers varied rod combinations and conducted experiments with various stroke lengths and speeds, but none of these measures halted rod breakage.

Recent installation of Hydra-Rod pumps has practically eliminated this problem. Currently, the wells are pumping ten to twelve 64-in. s.p.m. All of the five pumping units are driven by 15-hp. electric motors using power generated in the field.

Oil Characteristics

Gas in solution in the Tensleep is negligible at Hidden Dome, measuring only 0.4 cu. ft. per bbl. of oil. Consequently, the bubble-point pressure is nearly zero and the behavior is that of a single-phase oil. Density and viscosity decreases constantly from original reservoir pressure of 1,800 psig. to bubble-point or nearly zero gage pressure. This behavior is characteristic of a dead crude.

Viscosity variation . . . With most reservoir oils, variation in viscosity from original reservoir pressure to saturation pressure (bubble point) is almost imperceptible. However, at Hidden Dome, viscosity of Tensleep crude changes in the order of nearly two to one between these two pressure conditions. Viscosity at 1,800 psig. was 290 cp. and at zero pressure gage or bubble point was 195 cp.

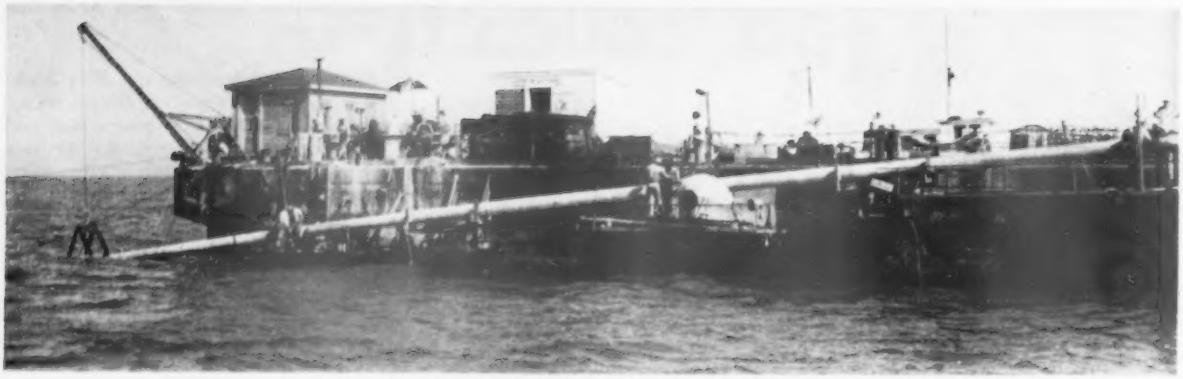
Bottom-hole samples were taken in the spring of 1947, a few months after completion of the discovery well in the Tensleep reservoir. Two samples of 600 cc. each of the reservoir fluid were gathered to obtain duplicate laboratory tests. Crude from both tombs were tested at the Dallas laboratory of Core Laboratories, Inc.

A standard rolling-ball-type viscosimeter was employed for measurement of viscosity. Readings were made initially at 1,800 psig. (the original reservoir pressure) and at intervals of 300 psi. down to zero pressure gage. Roll times were duplicated to obtain precision to within .5 per cent.

Reservoir Geology

Hidden Dome field is located in Townships 47 and 48 North, Range 90 West on the east limb of the Big Horn basin. Structure is an elongate asymmetrical anticline; its major axis trends from northwest to southeast. About

(Continued on page 91)



Rear end of L.S.T. lay barge showing equipment for supporting the pipe and lowering in.

When Pipe Lines Take a Water Route...

... Concrete coating protects pipe from corrosion attack

by P. H. Timothy

Part 2

PERHAPS the most critical problem experienced in laying concrete-coated pipe was the determination of the proper method of supporting the coated pipe on the laying equipment to avoid cracking and breaking off the concrete coating. All the effort and expense expended in the investigation and application of the concrete coating would have been of little value, had the concrete been permitted to enter the water cracked and badly damaged.

Furthermore, cracks in the concrete would have permitted salt-water intrusion of the coating, which would have resulted in rapid corrosion of the steel reinforcement and disintegrating of the concrete due to spalling. The pipe itself would then have become exposed to attack and corrosion and failures would have resulted within a few years.

This problem was especially serious as it had to be worked out after the first attempt at laying was made in the field and while operations were suspended pending the development of a method of laying the pipe which would not damage the concrete coating.

Canal laying . . . When laying in canals two 110 by 30-ft. barges were used, hinged together at adjacent ends, for the welding and coating operations. Ahead of the lay barges was a 120 by 30-ft. pipe transfer barge and in rear was a 50 by 20-ft. sand barge. Work was carried on simultaneously at five stations on the lay barges. The first four stations were protected with canopies. The last station was uncovered and located at the end of the rear lay barge.

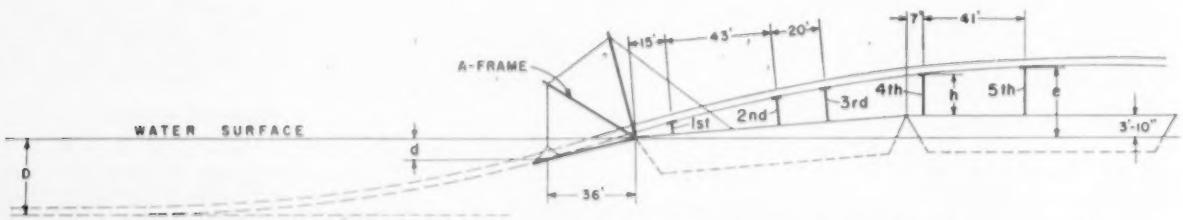
The pipe was stalked on with the side boom and lined up at the first station where the stringer bead was then applied. Welding was completed at the second station. At the third station the joint was cleaned and primed and, thereafter, the weld was X-rayed. The joint was doped and wrapped by hand at the fourth station and at the fifth station the concrete joint was made.

A most satisfactory method for laying the concrete coated pipe was finally worked out. On the lay barges the curvative of the pipe was reversed near the water line and the pipe was sloped downward to a horizontal position at the forward end, as shown in the accompany diagram, Fig. 1.

By sloping the pipe in this manner it was kept to within convenient working heights above deck at the various working stations and sufficiently low at the forward end to permit handling with a side boom.

The end of the rear lay barge was pumped down to about the water line and the deck of the forward barge was trimmed to 3 ft. 10 in. above water as indicated in Fig. 1. The pipe was supported by five supports on the lay barges, two on the forward and three on the rear barge. Each support consisted of a bank of rubber-covered rollers of sufficient length to permit the uncoated field joint to ride over it without dropping. The positions of the five pipe supports are also shown in Fig. 1, together with other critical dimensions.

Minimum depth . . . The minimum depth of the bottom of pipe in dredged



h = height of top of any support above deck.
e = height of top of any support above water.
D = depth of water to bottom of ditch or to bottom of pipe.
d = depth of water to bottom of pipe at midpoint of A-frame cradle.

Fig. 1—Position of pipe supports on laying barges.

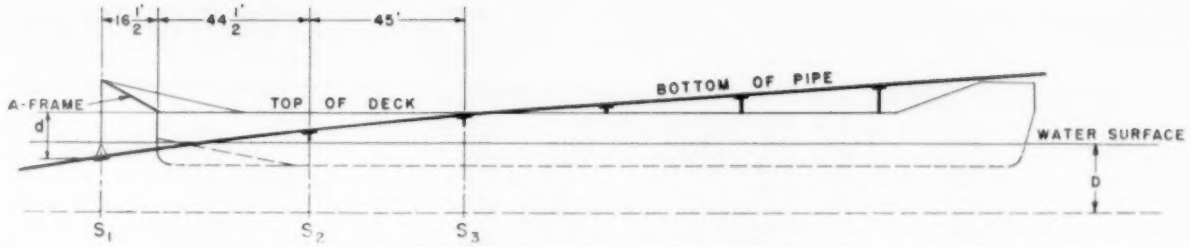
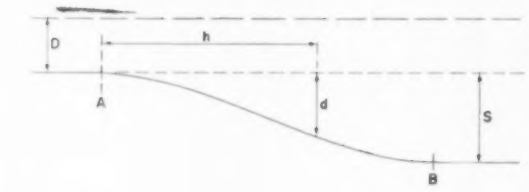


Fig. 2—Position of pipe supports on L.S.T.



S is total depth of sag.
D is depth of bottom of pipe line trench before sag.
A and B are points of start and end of sag.
d is increase in depth at distance h from A.
D+d is depth below water at distance h from A.

VALUES OF "d" FOR 50' INCREMENTS IN "h" ARE SHOWN BELOW. THESE VALUES MUST BE ADDED TO "D" TO OBTAIN DEPTHS BELOW WATER

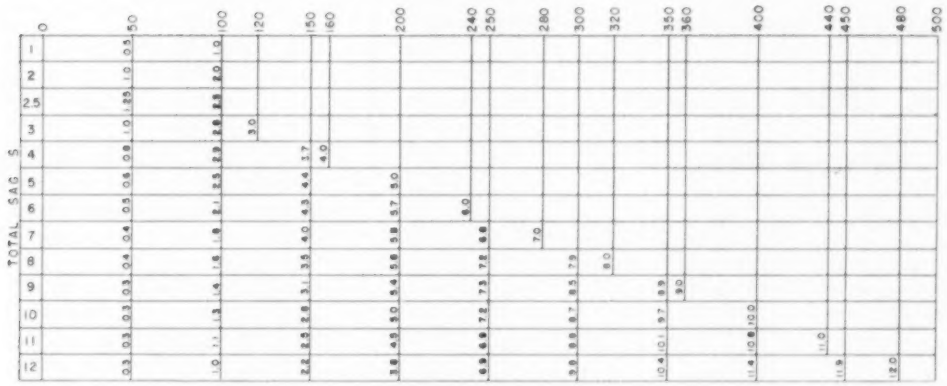


Fig. 3—Determination of sag.

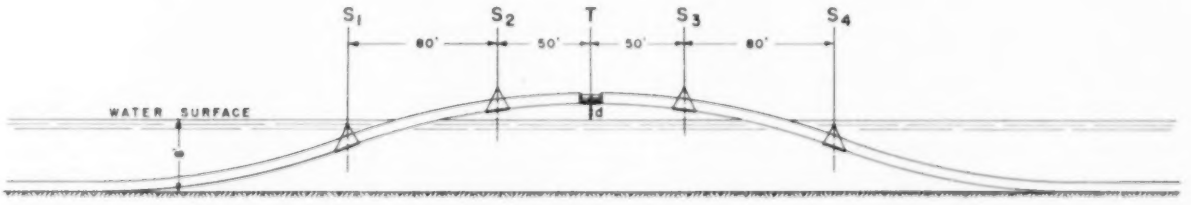


Fig. 4—Making ties in canal laying.

canals was 8 ft. below mean sea level. Lunar and wind tides increased this depth at times to as much as 12 ft. during the working season, and, hence, it was necessary to devise a means for readily accommodating the canal laying operations to depths varying from 8 to 12 ft. This was accomplished by means of a submerged pipe-support cradle suspended from an A-frame. In the diagram the A-frame is shown attached to the end of the rear lay barge. Actually, it was suspended from the side of the sand barge at the same relative position.

Approximately 150 waterway crossings of various depths were made in laying the marine lines. In designing a crossing, the line can either be sagged down within the safe limits of bending the pipe without cracking the concrete or mechanical bends can be used. Sagging, of course, necessitated more dredging, whereas the mechanical bends were costly to install. The economical limit for sagging the concrete coated line was found to be approximately 12 ft. Therefore, for crossings deeper than about 18 ft. (12 ft. plus the 6-ft. depth to the top of pipe in canals), it was generally cheaper to use mechanical bends.

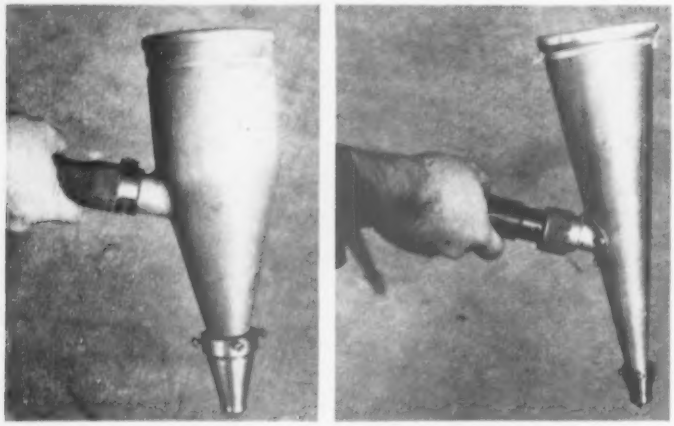
In pipe-line canals proper the depth of water to the bottom of the pipe was 8 to 12 ft. depending on the tide. At intersecting waterways it was necessary to provide for sagging the pipe in depths up to 20 ft. The roller-type pipe supports on barges were made adjustable. In canal laying the supports were set for the 8-ft. depth and by simply adjusting the cradle, provision was made for variations in this depth up to 12 ft.

When sagging down for waterway crossings to depths in excess of 12 ft. the adjustable pipe supports were set for the 12 ft. depth and variations in depths up to 20 ft. were likewise provided by lowering the cradle to a prescribed distance, as shown in the following table, which gives the values of "h" and "e" when "D" equals 8 ft. and 12 ft., respectively:

	1st Support		2nd Support		3rd Support		4th Support		5th Support	
D	h	e	h	e	h	e	h	e	h	e
8'	1'-5"	1'-11"	3'-1"	5'-1"	3'-6"	6'-3"	3'-9"	7'-7"	4'-2"	8'-0"
12'	1'-11"	2'-5"	4'-6"	6'-6"	5'-4"	8'-1"	6'-6"	10'-4"	7'-10"	11'-8"

When laying in canals, the pipe supports were set for the 8 ft. depth given

(Continued on page 91)



Two types of hoppers in common use fitted with adapter tips.

Semiautomatic welder adapted to magnetic flux

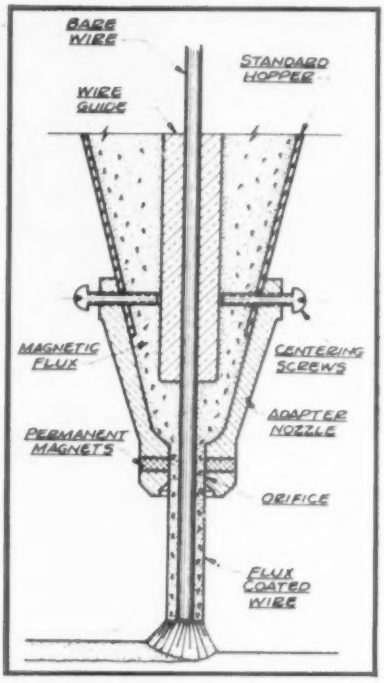
by R. A. Hand

AN extremely simple, inexpensive nozzle adapter for the conventional semiautomatic or "squirt" welder gives promise of a new and considerably wider use for this machine. The device makes possible the deposit of various alloys at speeds far higher than can be obtained by ordinary manual welding, even exceeds the deposition rate achieved by the full automatic electric welding head. In essence the process utilizes the magnetic field created by the passage of the electric current through the bare electrode, plus a magnetic alloy flux which coats the wire immediately ahead of the welding arc. The operating cycle is completed by the use of permanent magnets in the nozzle adapter which act as a dam to to the flow of flux whenever the arc is broken.

Author is automatic welding specialist, Stoody Co., Whittier, Calif.

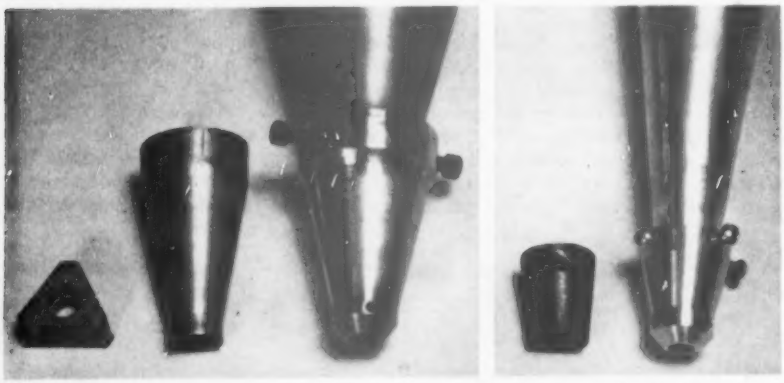
The whole process is merely a combination of two accepted and proved welding methods — the squirt welder which uses a granular nonmagnetic flux to produce the common submerged melt deposit, and the magnetic flux method of automatic welding as perfected by Brown Boveri in Switzerland some years ago. The squirt welder, employing the hidden arc beneath a simple flux, is in everyday use and is familiar of course to all those interested in welding.

The Brown Boveri method is less widely recognized. Basically it depends upon use of the magnetic field surrounding the welding electrode in conjunction with a granular magnetic metallic flux. In this machine the flux in the standard hopper is fed by gravity to a cup around the contact jaws. Thus, when the arc is established the magnetic lines of force cause the flux to adhere to the wire, producing what is to all intents and purposes a coated electrode. The amount of flux applied to the wire is governed by the size of the orifice in the cup. In the Brown Boveri equipment an electromagnetic coil in the cup acts as a dam when welding is interrupted. This general process was covered by European patents some 8 years ago and has been used since then for mild steel fabrication much as the submerged melt process has been employed.



Cross-section through adapter nozzle.

Some time ago Stoody Co. became interested in magnetic flux as a possible method of applying alloy materials through semiautomatic welders, the use of which is limited to small diameter wires, generally 5/64 and 3/32 in., sizes too small to be fabricated into tubular wires such as this company furnishes for application through the full automatic head. The Brown Boveri method, as adapted to the squirt welder and tested over a considerable period, appears to offer numerous advantages over both manual and present semiautomatic welding. As applied to build-



Closeup of two types of adapter tips installed on standard hoppers. Original tip shown with each.

up and hard facing, the magnetic process provides much higher deposition rates (8 to 20 lb. of deposited metal per hour, using 5/64 or 3/32-in. wires); the deposition rate will depend upon amperage. Deposits are sound, with the consistency and uniformity characteristic of the automatic welding method. Time lost in changing electrodes is eliminated and there is of course no stub-end loss. There is no need for maintaining large stocks of various electrode diameters. Welding time and material costs are shown to be markedly reduced.

By comparison with the semiautomatic hard-facing method utilizing an alloy submerged melt flux, the magnetic process eliminates considerable waste, since all the flux applied to the wire is consumed. This feature also makes unnecessary flux recovery equipment and screening for reuse. An important consideration is the fact that with the magnetic process the welder is using an open arc which allows him to see the actual welding at all times, gives him better control of the deposit and permits the hard facing of irregularly shaped parts. While the conventional hopper is of small size for ease of handling, it is necessary to refill it only infrequently, since the ratio of deposited metal to flux used is approximately equal. Another advantage of the open-arc magnetic method as against the submerged melt process is that no flux dams, jigs, or fixtures are needed.

The squirt welders now in common use may all be readily adapted to operate with magnetic alloy flux. The photographs and sketch show clearly how easily the adaptation is made. The adapter tip containing the permanent magnetc replaces the standard tip, centers the wire to assure a concentric flux coating and governs the amount of flux applied to the wire.

Stoody has developed a series of magnetic flux materials designed for both buildup and the application of hard facing overlays. The alloys will be marketed under the trade name of Stoody Magnecote, numbered and described for purposes of identification. The first material to be released is Stoody Magnecote 301 which produces a manganese deposit of full Hadfield properties. Other materials will be marketed very shortly, following conclusive tests.

All-Electric Rig Drilling in Ventura Avenue Field

(Continued from page 67)

motor can be restarted only by returning its controller to the off position in order to reset the control relays. Any one motor can be reset and restarted, regardless of the position of the other controllers.

The drill-hoist selection is prearranged by the position of eight selector switches mounted in the control cabinet dead-front section. Each generator has two selector switches, one of which is used to determine the generator use when the drill button is pressed, and the other when the hoist button is pressed. Each generator has four main contactors so that it may be assigned to any one of the four motors. If the generator is not to be used, its selector switches are turned to the off position.

The preassignment of generators is usually made according to the drilling and mud-pumping requirements. For instance, a typical preselection arrangement would be to assign three generators to the draw works, and one generator to the mud-mixing pump, for the hoist position, and to assign one generator to the draw works, and two to No. 1 mud pump, and one to the mud-mixing pump for the drill position. These two basic assignment schedules would ordinarily not be changed until quite different power requirements are needed for circulating current.

Protective features . . . Many protective features are included in the automatic control scheme. If stall current is held on any one of the motors too long, a siren sounds to warn the operator of an overload condition. Sensitive relays that measure the motor voltage and the generator voltage are used to supervise the operation of each generator contactor so that it cannot operate under conditions that would cause flashovers or other damage to the generators. Automatic protection is also provided to prevent the inadvertent assignment of a generator which is not running. If any one of the main motor field circuits should be interrupted, or if the forced ventilation fails, that motor is automatically stopped.

All of the generator voltmeters and ammeters are mounted on the dead-front section of the control board while the motor ammeters are mounted at the driller's post. The motor ammeters give a direct indication to the driller of the torque load condition on each motor.

The induction motors of the motor-generator sets are line started with oil-immersed contactors mounted on the bedplate between the motor and the generator. Each motor feeder from the main transformer bank is protected by an oil fuse cutout switch. The transformer bank primary is energized through an oil circuit breaker which is manually operated and electrically tripped on severe overloads.

Moving ease . . . The electrical setup is very easily taken down and made up as shown by the first move, when all the electrical circuits were reestablished in an 8-hour working day by three men. This is made possible by the use of polarized plugs and receptacles on all of the control cables. The main power leads are of superflexible, 500,000-circular-mil cable, rubber covered, with heavy solder lug terminations. All cables are carried to the drilling rig motors on expanded metal trays.

All control cables and main conductors can be disconnected by means of plugs and receptacles and quick-break connectors at the points where the dolly walk and drilling structure breaks for transportation. Thus the cables are transported in place when the rig is moved and it is only necessary to make up the various connectors to reestablish the electrical circuits.

Speed Control Method

Where wide-range speed control is required on jobs such as oil-well drilling, the variable-voltage d.c. drive offers advantages difficult to obtain with any other drive. The choice of drive rests principally upon the speed-torque characteristics of the load and on the over-all economy of the variable-speed drive.

Figures 4, 5, and 6, when compared with Figure 3, show the advantages of the variable-voltage d.c. drive over other means of using a constant-speed source of power to drive a variable-speed load such as an oil-drilling rig.

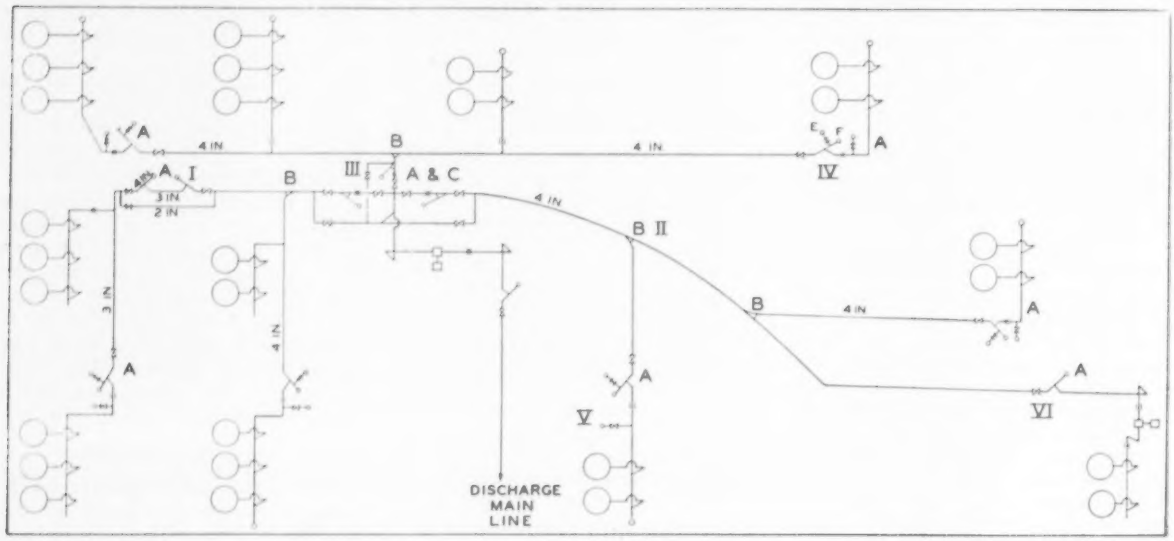
Changing the secondary resistance of an induction motor (Fig. 4) or using slip couplings (Fig. 5) is very inefficient at high torques. Also with these two systems there is no input-horsepower limit such as that obtainable with the variable-voltage d.c. drive.

The hydraulic torque converter (Fig. 6) gives essentially the same advantages in horsepower input and speed-torque characteristics as the variable-voltage d.c. drive except the torque converter cannot provide low speed and low torque when driven by a constant-speed motor.

Cosden Aromatics . . .

In the article "Small Refiner, But Big Products List . . ." dealing with Cosden Petroleum Corp. Platformer-Udex operation *(The Oil and Gas Journal, January 4, 1954, page 72)* the cost of aromatics clay treating was inadvertently quoted at 25 cents per barrel (page 75). Correct cost is of course 0.25 cent per barrel. Cut lines were also transposed between the block-flow diagram and photo (pages 72 and 73).

Pipe-Line Patrol



GENERAL GRAVITY SYSTEM, showing Exhibits A, B, and C. Sketch 1.

Standard fittings and piping layout effect

Improved Operation, Lower Costs On Field Gathering System

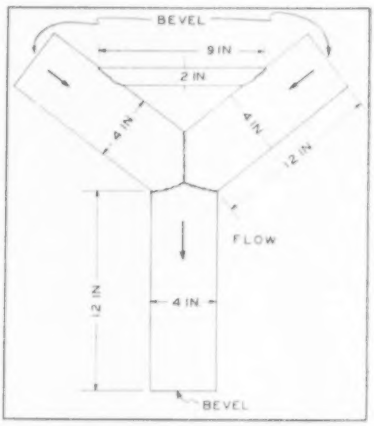
by F. Lawrence Resen
Gulf Coast District Editor

IMPROVED operations and lowered operating costs will result if standard fittings and piping layouts are used on field gathering systems.

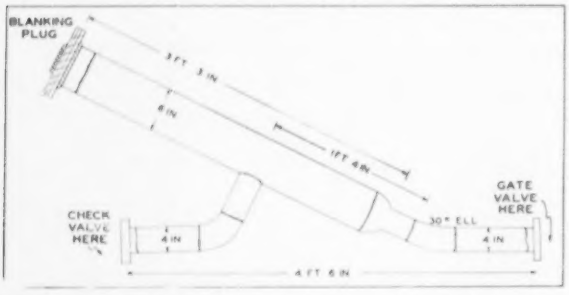
T. W. Detlefs and S. R. Plummer, Humble Pipe Line Co., Odessa, Tex., district, have devised a field-fabricated scraper trap, a line Y-connection, and a bypass system which can be used to achieve such improved operations.

The proposal advanced by Detlefs and Plummer would in general standardize scraper-trap installation and when all three units are combined in a gathering system they would tend to lessen over-all cost of construction and make the operation of running scrapers relatively simple, thereby lowering operating costs.

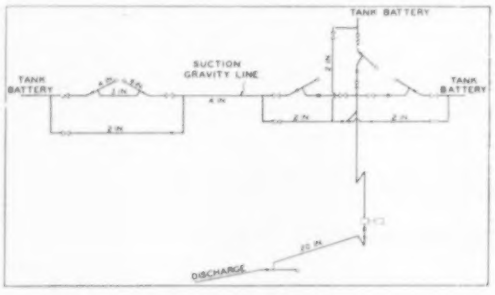
Scraper trap . . . The scraper trap, Exhibit A, can be fabricated in a welding shop and installed in the field by means of a flange connection. The trap consists of a length of 6-in. pipe with a blanking plug at one end and con-



Y-CONNECTION is another standard item employed in field system. Exhibit B.



FIELD SCRAPER TRAP is standard item used in field pipe-line system. Exhibit A.



FIELD-LINE BYPASS is used when it is inconvenient to shut down system. Exhibit C.

nected to two lengths of 4-in. pipe. The trap makes a 30° angle with the gathering system line and the 4-in. pipe lengths, which have the same axis, are connected to the scraper trap with appropriate fittings, having flanges welded on their ends so they may be easily tied in with the gathering system. Continuity of flow in the gathering lines is maintained through the scraper trap itself.

The trap can be utilized for either an entry or recovery trap and can be installed in any straight line.

In using it as an entry trap, the operator would close the line valves on both sides of the trap, remove the blanking plug, insert the scraper, replace the plug and open all gate valves. If the trap is at a position such as IV, Sketch I, it would be necessary to use a scraper pump connected through E and F to start the scraper on its way. If the trap is at a position such as VI, all that is necessary is to start the pump and the natural flow of oil will send the scraper on its way.

When used as a recovery trap, the scraper will enter the unit easily and will not obstruct the normal flow of oil through the unit. The trap is made large enough so that it may hold two scrapers without having to shut down the line. When the blanking plug is removed, the scrapers may be easily taken out of the trap since they would be lying loose in an oversize barrel.

An important feature of the traps is their interchangeability, since the use of several different types adds to the complexity of the stocking problem for replacement and spare parts.

Y fittings . . . The Y line connection, Exhibit B, consists of two lengths of 4-in. line pipe joined to a third in the shape of a Y by welding. The two arms of the Y are reinforced by a length of 2-in. pipe which is welded across the crotch. This line connection is designed to be fabricated in a welding shop and then welded in place in the field.

Although the Y connection has been tried many times without success, it is felt that the fitting suggested in Exhibit B will perform satisfactorily. The two types of failures have been due to breaking at the crotch of the weld and the scrapers getting hung up at the intersection. The fitting shown has the reinforcing bar to prevent its fracturing and also allows scrapers to pass with ease from either direction.

With the Y installed at a position such as II in Sketch I it does away with the necessity of installing another trap, one check valve and one gate valve. If it were installed at Point II, it would only be necessary to make two slight bends in the straight line. Such an installation has been used satisfactorily.

Bypass . . . The 2-in. bypass, Exhibit C, merely consists of a 2-in. line and appropriate valves which can be installed with screw fittings so that flow can be diverted around various scraper traps as desired.

The advantage of the 2-in. bypass arrangement lies in its permitting the scrapers to be run without shutting down the system.

The 2-in. line is large enough to allow passage of oil during the short time it is necessary to remove or install the scraper.

Time is saved in that the scraper crew does not have to travel up and down the line starting up and shutting down the main pumps when scrapers are being handled. Upon arrival of the scraper into a trap, the crew would merely open the bypass, close in trap and remove scraper without having to stop the main flow of oil through the system.

When Pipe Lines Take a Water Route

(Continued from page 87)

in the above table and the value "d" for the cradle was then adjusted as follows:

D	8′	10′	12′
d	3′-2″	3′-6″	3′-10″

When sagging for intersecting waterway crossings to depths in excess of 12 ft., the pipe supports were set for the 12-ft. depth given in the above table and the value "d" for the cradle was then adjusted as follows:

D	14′	16′	18′	20′
d	3′-8″	3′-9″	3′-11″	4′-0″

Offshore . . . For offshore laying a converted LST was used in depths in excess of about 10 ft. The sequence of operations and the technique of laying were the same as on the lay barge. The positions of the pipe supports including the cradle are shown in Fig. 2.

Only three adjustable supports, S_1, S_2, and S_3, were required on the LST. All supports forward of S_3 were on a straight line having a slope of 7 ft. in 100 ft. Supports S_2 and S_3 were adjusted so that the bottom of the pipe was 5.5 ft. and 1.2 ft., respectively, below deck level at the center of the supports. The cradle S_1 was adjusted for increased depths by varying the distance "d" as indicated below:

D	12′	14′	16′	18′	20′
d	12′-5″	12′-7″	12′-9″	12′-11″	13′-0″

The rear end of the LST with the cradle suspended from the A-frame is shown in an accompanying cut.

When excavating a trench for sagging concreted coated lines at waterway crossings, the depth of the top of the trench or the bottom of the pipe for 50-ft. stations are shown in Fig. 3.

To allow for tolerances in dredging and in estimating water levels, the maximum deflection or curvature of the pipe used in the above table is one-half that used on the laying equipment where the bending of the pipe can be precisely controlled.

Whenever ties were made to concrete coated lines, each line was raised, supported and lowered as indicated in Fig. 4.

Hidden Dome Yields 270-Cp. Viscosity Oil

(Continued from page 85)

300 ft. of structural closure has been measured on top of the Frontier sandstone of Upper Cretaceaus age. Cody shale is the oldest exposed rock on the anticline.

Originally, Hidden Dome was a shallow gas field. Ohio Oil Co. drilled the discovery gas well in the field in 1917 at its No. 1 test, NW SE SE 31-48n-90w and completed at 1,492 ft. in Frontier for 4,000 M.c.f. of gas per day, on initial open-flow test. Cumulative recovery from Frontier gas reservoir was 22.1 billion cubic feet.

Oil Production

Frontier . . . Commercial oil production was found in the Frontier in October 1932 on the northwest terrace of this anticline. Discovery-oil well, in NW NW 31-48n-90w, was completed from a depth of 1,450 ft. Cumulative recovery from Frontier was 409,000 bbl. to January 1, 1953. Produced gravity averages 41.4° A.P.I.

Tensleep . . . Crest of the structure was drilled to the Tensleep objective and oil found in this formation at a depth of 4,500 ft. in October 1946. Ohio Oil Co. Tensleep O.P.C. No. 1, Well No. 2, NW SE SE 31-48n-90w, produced initially 160 bbl. of 19.8°-gravity oil per day.

Development was conducted along the major axis of the anticline. In the ensuing 1½ years, five Tensleep oil wells were completed on a density of 40 acres per well. Two dry holes limited the reservoir on the northeast and southwest flanks. Cumulative oil recovery was 530,000 bbl. to October 1, 1953.

Several deep tests have been drilled to the Mississippian Madison limestone but no oil has been found in that formation.

Simplify Your Oil and Gas Calculations—5

by Louis J. Murphy
International Engineering Associates, New York

THIS chart gives maximum depth at which a bellows-type valve may be used at given values of casing and tubing pressure and given flow gradient in a continuous-flow gas-lift installation. Chart 4, presented in preceding installment, gave distance between valves in intermittent-flow installation. Examples for use with these charts will be presented in later installments of this series.

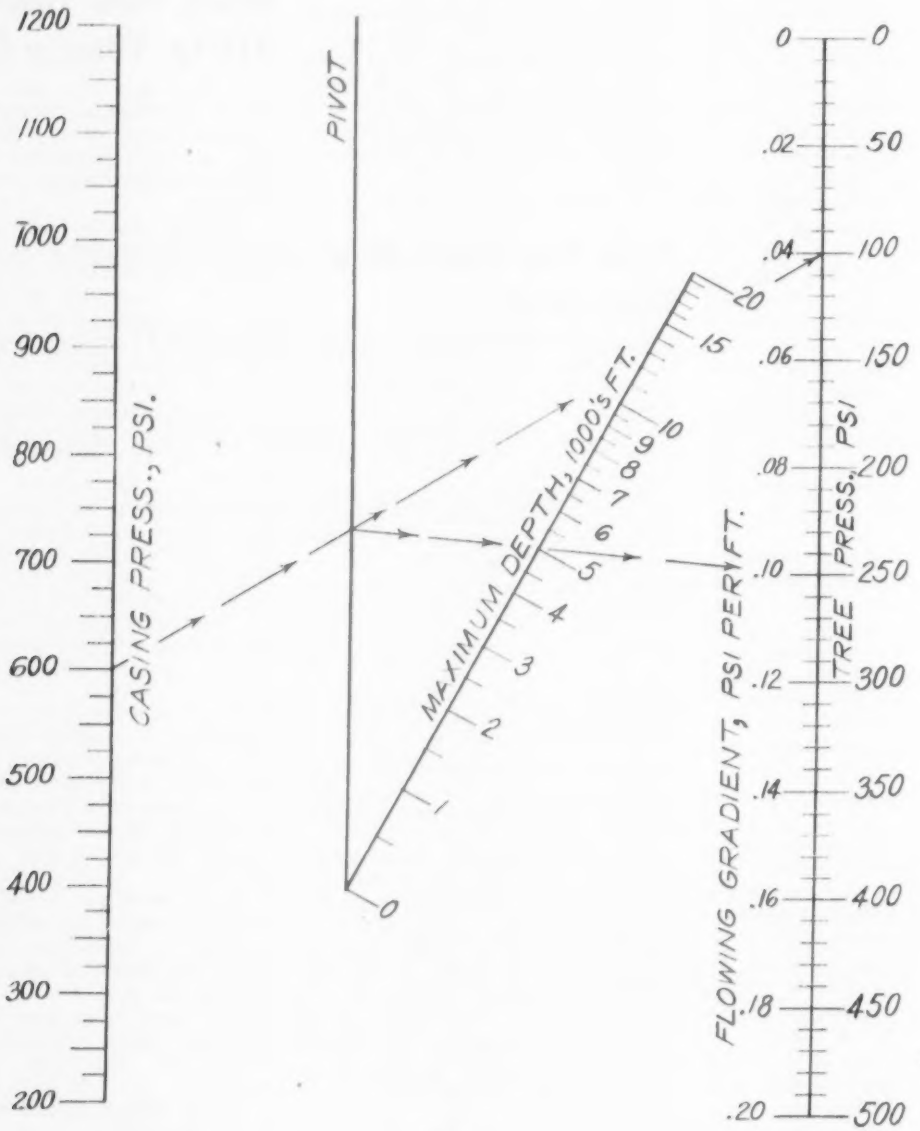


Chart 5

2. Electronic Gating Knockmeter . . .

for combustion studies in full-scale engines

by M. M. Adams

THE reader is referred to Fig. 2 of the first installment of this series *(The Oil and Gas Journal, January 4, 1954, page 95)* for a diagram of the circuit of the electronic gating knockmeter. Description of the synchronization channel, which was begun in that installment, is continued here.

A selected portion of the sharp rise in voltage occurring at Plate 2 of V-2 is differentiated and used to trigger V-3. The magnitude of this triggering voltage is not critical but must be of the order of 20 volts minimum. V-3 is a one-shot multivibrator with Section 1 normally cut off and Section 2 normally conducting. When the differentiated, positive pulse from V-2 drives the grid of Section 1 of V-3 to conduction, the negative pulse on Plate 1 is used to drive Section 2 far below cutoff. The time during which Section 2 remains cut off can be controlled by the "gate delay" control available on the front panel. The delay period can be made as long as 0.125 second which corresponds to a complete revolution of an engine operating at approximately 500 r.p.m. Following the delay period, the second section of V-3 again conducts and Section 1 is cut off. When Section 1 is cut off, a portion of the positive plate pulse is selected, differentiated, and used to trigger V-4. Again, the magnitude of the trigger voltage is not critical but must be a minimum of about 25 volts. The magnitude is determined by the setting of the "delay output" potentiometer available through the cabinet top. At the instant of initial triggering of V-3, Plate 2 rises in voltage. This positive pulse is used to trigger the external sweep of the oscilloscope used with the equipment and is available at a jack on the rear of the instrument.

The differentiated positive pulse imposed on the grid of Section 1 of V-4 drives that portion of the tube to conduction and the second section, which is normally conducting, to cutoff, producing a negative pulse on Plate 1 and a positive pulse on Plate 2. Both pulses have a magnitude of approximately 90 volts and the time length is determined by the setting of the "gate width" control available through the top of the instrument. The gate width control allows selection of any gate width by the operator between the values of 0.0002 second and 0.020 second.

Synchronization Channel

In summary, the function of the synchronization channel can be described as (1) reducing by a factor of 2 the number of synchronization pulses from the flywheel pickup, (2) introducing a selected delay period following each remaining synchronization pulse, and (3) generating a gate of selected width following completion of the aforementioned delay.

The signal and calibration channel is comprised of Section 1 of V-5 and Section 2 of V-6. These two triodes form a variable-gain, high-input-impedance amplifier. The second section of V-6 (the output stage of the amplifier) has its plate tied directly to Plate 2 of V-4 (gate generator) through a 220,000-ohm load resistor. The available plate supply voltage is approximately 95 volts, except during the gating period when it abruptly rises to, and remains at, 185 volts. This produces the rectangular d.c. pedestal upon which signals arriving through the pickup input jack are superimposed. Maximum gain of the amplifier is approximately 60 db. and the frequency response is flat to 5 kc. A lead from the plate of the pulsed stage is taken directly to the "scope output" jack on the rear of the instrument so that it can be impressed on the vertical plates of an oscilloscope for observation. The same signal is impressed on a high-impedance voltage-dropping circuit which transmits it to the integrating channel.

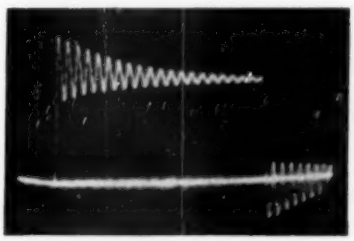


Fig. 1—Photograph of oscilloscope trace when "Cal-Run" switch of calibrating section is in the Cal. position.

Calibration Section

The calibration section consists of a high Q, 50-millihenry choke in parallel with sufficient capacitance to resonate the circuit at 5 kc. When the "Cal-Run" switch inside the cover is turned to the Cal. position, this parallel resonant circuit is placed between the grid register and ground of the pulse stage. When the gate pulse occurs, the leading edge drives the circuit of the "ringing" oscillator through capacitative coupling and these decaying oscillations are impressed on the grid circuit and may be plainly seen on the oscilloscope screen. Since this circuit is tuned to 5 kc., each cycle of the ringing circuit corresponds to a time interval of 0.2 millisecond. A typical photograph of the oscilloscope trace when this switch is in the Cal. position is shown in Fig. 1.

Author is manager of instruments division, Phillips Petroleum Co., Bartlesville, Okla.

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How to Design and Evaluate Absorbers—11

by R. J. Hull and K. Raymond

THE method of obtaining component over-all tray efficiencies and the range of values to be used for design have been discussed previously.

Over-all tray efficiencies . . . With few exceptions, propane and butanes tray efficiencies were in good agreement with the recommended design values. Significant deviations were as follows:

1. Many of the deviations in indicated tray efficiencies were due to analytical errors mentioned above. It is obvious that errors in analytical results will give improper component recoveries and in turn improper indicated over-all tray efficiencies.

Other analytical errors that may have significant effects on efficiency determinations are the reporting of trace amounts of butanes in the discharge gas as "0.01" per cent, and neglecting traces of butanes present in poorly stripped lean oil. At very high butane absorption factors these errors may result in low indicated tray efficiencies.

Unavoidable errors in isobutane-n-butane separations in very low butane content discharge gas analyses may be minimized by calculating a combined butanes efficiency. The combined efficiency is obtained as follows: (a) calculate the individual butanes recoveries for various numbers of theoretical trays at the respective calculated absorption factors, and plot the total butanes recovery versus the number of theoretical trays; (b) obtain from this plot the number of theoretical trays required to give the actual total butanes recovery as indicated by the difference between intake and discharge gas rates and analyses; (c) divide the number of theoretical trays found in (b) by the number of actual trays for the combined efficiency.

2. Some runs showed low or high recoveries for propane and correspondingly low or high efficiencies for butanes, probably because of an improper assignment of molecular weight to the lean oil used in the calculations. If the butanes absorption factors were multiplied by the ratio of actual to calculated propane yields, the butanes efficiencies usually came out near 33 per cent.

3. In the noncommercial range of 40-65 per cent butanes recovery, calculated butanes yields tended to be high and indicated efficiencies were very low. It is believed that the discrepancies in this range are due to shortcomings of the absorption factor calculation method itself, probably because of the assignment of improper effective absorption temperatures.

Authors are with California Research Corp., Richmond, Calif. Paper presented at California Natural Gasoline Association meeting, Los Angeles, October 8-9, 1953.

Example Absorber Performance Evaluation

A sample evaluation is presented in order to illustrate procedures used in checking absorber performance. The example is based on actual absorber test data and is chosen to illustrate the method of correcting component recoveries when the lean oil contains low boiling solutes. The test data are presented on Table 2.

1. Calculate mole fractions and quantities of components in lean oil:

	Liq. %	Gal./day	M.c.f./day	x_o	M. lb./day
C_1	0.017	26	1	0.0004	
C_2	0.497	751	29	0.0120	2
C_3	1.934	2,924	106	0.0441	12
"Normal lean oil"	97.552	147,499	2,270	0.9435	1,019
	100.000	151,200	2,406	1.0000	1,033

$$\text{"Normal lean oil" rate} = \frac{147{,}499 \times 6.910 \times 0.3786}{170} = 2{,}270 \text{ M.c.f./day}$$

2. $T_{BO} - T_{LO} = 78 - 65 = 13°$ F. From Fig. 3, obtain estimated top section heat of absorption = 5.8 B.t.u./lb. lean oil.

3. $(T_{LO} + T_{BO})/2 = (65 + 84)/2 = 74.5°$ F. From Fig. 6 at 5.8 B.t.u./lb. and 24 trays.

$$T_{AV} = \frac{T_{LO} + T_{BO}}{2} = 18.5$$

$$T_{AV} = 74.5 + 18.5 = 93° \text{ F.}$$

4. Assume shrinkage, S = 900 M.c.f. per day.

5. First trial $(L/V)_{BTU} = (L_o + S)/V_{BO}$

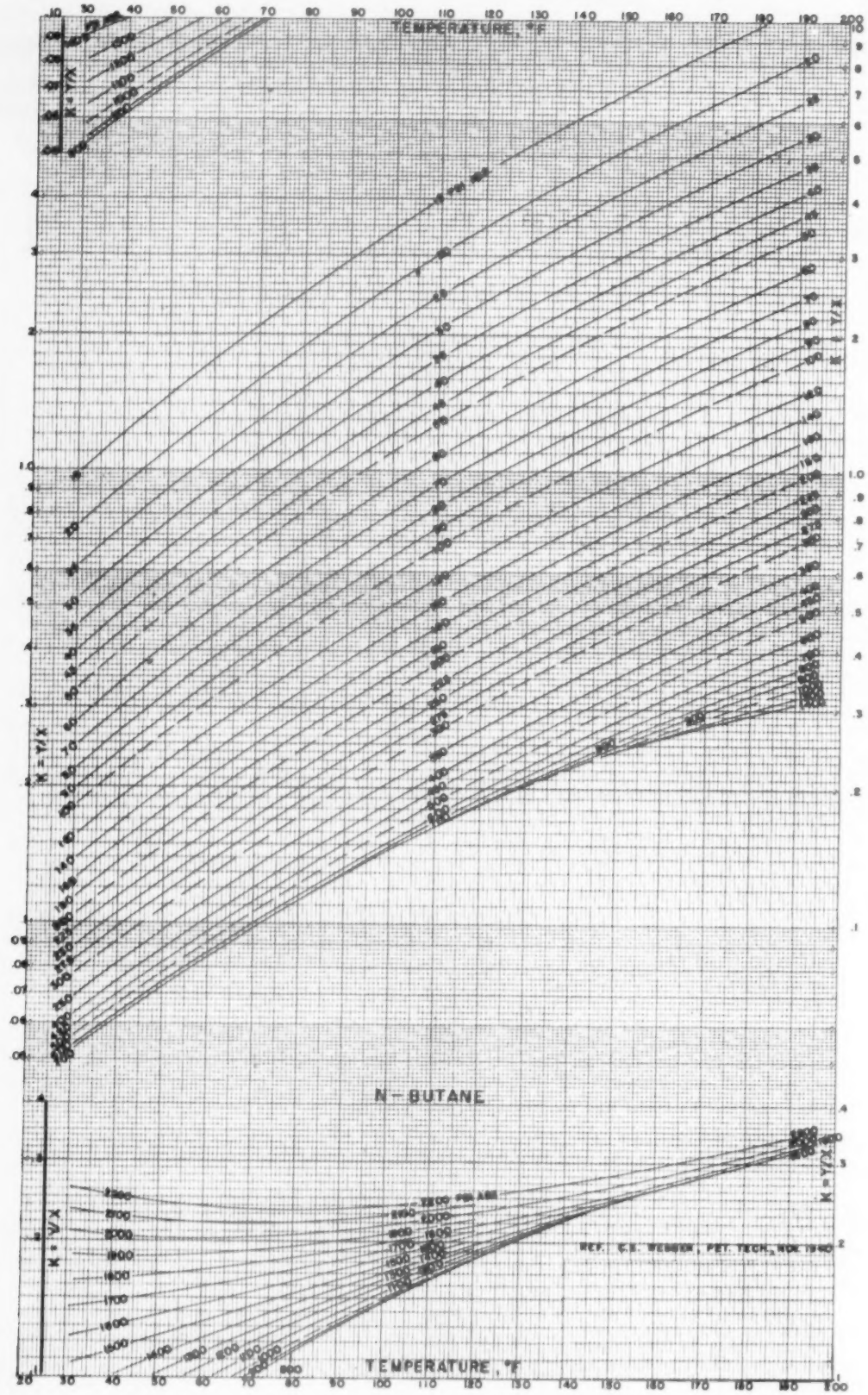
$$= \frac{2{,}406 + 900}{6{,}500} = 0.509.$$

TABLE 2—ABSORBER TEST DATA

	Intake gas	Discharge gas	Lean oil
Pressure, psia.	245		
Temp., °F.	66	78	65
Rate, M.c.f./day	6,500		
Rate, gal./day			151,200
Gravity, °A.P.I.			*39.0
Mol. wt.			*170.0
(Rich-oil temp. 84° F.)			
Composition:	Vap. %	Vap. %	Liq. %
Air	6.18	6.66	
Methane	54.36	61.25	0.017
Ethane	26.65	25.08	0.497
Propane	12.81	7.01	1.934
Butanes plus			
Normal lean oil			97.552
	100.00	100.00	100.000

Note: Column—24 trays, 20-in. tray spacing, 48-in.-diameter column.

*Properties of normal lean oil.



Equilibrium constants for n-butane. Reference: C. E. Webber, Pet. Tech., Nov. 1940.

Applying Lube-Oil Additive—2

by W. D. Thomas

IT is interesting to note that early work in the field of antioxidants revealed that elemental sulfur and phosphorous were effective in retarding oxidation of hydrocarbon oils. However, neither is practical for automotive engines because of their corrosive effect on engine parts.

Inhibitors . . . Oil-soluble organic sulfur compounds were among the first inhibitors used. Examples of additives of this type were sulfurized sperm oil, sulfurized terpenes, and sulfurized poly olefins.

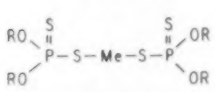
Similarly, phosphorous has been incorporated into lubricating oils by means of oil-soluble organic phosphorous compounds such as tributyl phosphite and tricesyl phosphite. Inhibitors of this type were effective in certain base stocks.

In the late thirties developments led to inhibitors which combined both phosphorous and sulfur in oil-soluble organic compounds. These products proved more efficient than the sulfur or phosphorous type and were found to be effective in a variety of base oils.

The two general types of combined phosphorous-sulfur inhibitors are:

Inhibitors

1. Dithiophosphates:



2. (a) Terpene P_2S_5 reaction product.
   (b) Poly olefin P_2S_5 reaction product.

The above types of sulfur-phosphorous inhibitors have found extensive use in commercial motor oils and are present in many of our modern-day passenger-car and heavy-duty lubricants.

How inhibitors such as those described above actually function in a substrate as complex as the mixture of hydrocarbons found in lubricating oil and under conditions which exist in an operating engine is not too well known. Reaction mechanisms can be postulated from experiments run in the laboratory in glass equipment. The difficulty lies in the attempt to predict the action in an automotive engine where a multitude of variables exist. The oil in the engine is subjected to the catalytic effect of various metals, and to moisture, and atmosphere of blowby gases and combustion products. As complex as the picture appears, it is believed that fundamental knowledge will be gained that will lead to a more systematic approach to the selection of improved inhibitors.

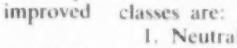
During the development of high-output engines it was found necessary to "stiffen" the units to withstand the increased structural stresses. Bearings made of copper-lead alloy and cadmium-silver alloy were found to withstand the high pressures exerted but were sensitive to corrosion caused by harmful acidic bodies arising from oil oxidation. This gave wider use to oxidation inhibitors, particularly of the phosphorous-sulfur type for they greatly retarded the corrosion of alloy bearings.

Detergent additives . . . These were developed to overcome the serious lubrication problem encountered in developing the high-output diesel engines. Because of the high temperatures involved in compression-ignition engines, difficulty was encountered with heavy deposits in the ring-belt area which would ultimately give rise to ring sticking. Resinous products, formed from the effect of high temperatures on the lubricant, combined with fuel soot to form the deposits. The need for an additive to keep the insoluble products dispersed in the oil and thus prevent their buildup on engine parts led to the use of aluminum naphthenate during the mid-thirties. Calcium dichlorostearate and calcium chlorophenyl stearate were also used about this time. Oils compounded with additives of this type became known as diesel or detergent oils.

Although the above additives maintained engine cleanliness by virtue of their dispersing action, they did have a prooxidant effect on the oil and in cases of severe duty tended to cause bearing corrosion. They were replaced with compounds having little or no prooxidant effect. These latter compounds, still widely used today, fall into two general classes: (1) sulfonates and (2) phenates.

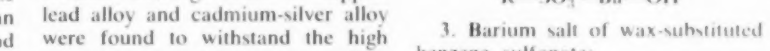
The chemical structure of some of the detergents falling in these classes are:

1. Neutral sulfonate:

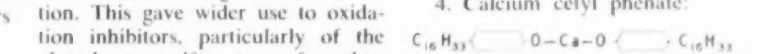


2. Basic sulfonate:

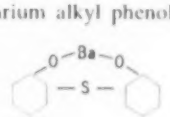
3. Barium salt of wax-substituted benzene sulfonate:



4. Calcium cetyl phenate:



5. Barium alkyl phenol sulfide:



The sulfonates are very widely used in crankcase oils today. They are derived from mahogany or oil-soluble soaps obtained by sulfonating selected lubricating stocks. In recent years the trend has been toward the use of basic or alkaline type of sulfonates because of their ability to counteract acid bodies which cause deposits and corrosive wear.

Of the phenates the barium and calcium salts of alkylphenol sulfides have found extensive use. Being salts of a strong base and a weak acid they also possess alkaline reserve.

Author is with American Cyanamid Co. From paper presented at W.P.R.A. meeting.

Don't Be Misled About "Corrosion Resistance"

by W. L. Nelson
Technical Editor

RESISTANCE to corrosion is a most elusive property. Types 302 and 304 stainless steels are attacked more rapidly than plain steel by a combination of high-temperature sulfide and naphthenic acid corrosion but upon adding 3 per cent molybdenum as in Type 316, one of the best known materials for such attack is obtained. However, plain carbon steel resists oxidation and sulfide corrosion better than 0.5 or 1.0 per cent carbon molybdenum steel (or very low-nickel steel). Tantalum or tungsten are often considered as resistant materials but they are inferior to plain cast iron when exposed to hot concentrated sulfuric acid. Iron is a better material than platinum for withstanding molten lead.

These confusing statements are necessary in emphasizing the fact that each corrosive condition must be met with its own particular corrosion resistant materials. Generalities about corrosion resistant materials are not only impossible but they may be dangerously misleading. Nevertheless, certain materials have become known for their specific resistance and some of these are shown herein. Most of the materials are also used for the more severe condition of "acid," "water" and "sulfide" corrosion encountered in refineries. The more common wrought chromium and stainless steels have been discussed on earlier issues of this page (Oxidation, February 2; Sulfide, March 2; and Application of Stainless Steel, August 17, 1953).

Common Corrosion Resistant Alloys and Steels

Alloy designation†	Chromium	Nickel	Molybdenum	Silicon	Copper	Manganese	Carbon	Others	Notes
CA-15 casting	11.5-14	*1	*0.5	1.5		1.0	*0.15		
CA-40 casting	11.5-14	*1	*0.5	1.5		1.0	0.2-0.4		
CB-30 casting	18-22	*2		1.0		1.0	*0.3		
CC-50 casting	26-30	*4		1.0		1.0	*0.5		
CE-30 casting	26-30	8-11		2.0		1.5	*0.3		
CF-8 casting	18-21	8-11		2.0		1.5	*0.08		
CF-20 casting	18-21	8-11		2.0		1.5	*0.20		
CF-8M casting	18-21	9-12	2-3	1.5		1.5	*0.08		Naphthenic acid and "sulfide"
CF-12M casting	18-21	9-12	2-3	1.5		1.5	*0.12		Hot dilute phosphoric acid, sulfur dioxide
CF-8C casting	18-21	9-12		2.0		1.5	*0.08	Cb 8×C min. 1.0 max.	
CF-16F casting	18-21	9-12	*1.5	2.0		1.5	*0.16	Se 0.2-0.35	
CF-16Fa casting	18-21	9-12	0.4-0.8*	2.0		1.5	*0.16		
CG-12 casting	20-23	10-13		2.0		1.5	*0.12		
CH-10 casting	22-26	12-15		2.0		1.5	*0.10		
CH-20 casting	22-26	12-15		2.0		1.5	*0.20		
CK-20 casting	23-27	19-22		2.0		1.5	*0.20		
CN-7M Cu casting	18-22	21-31	(‡)	(‡)	(‡)	1.5	*0.07		
Tantalum								Ta	Hot conc. and dilute cold hydrochloric acid, ammonium chloride and calcium hypochlorite
Silicon irons				13-15					Hot conc. or dilute sulfuric acid
Silicon moly iron		1	3	14					Hot conc. and dilute cold hydrochloric acid
Nickel silvers		18			60-64			18-32 Zn	Brines or dilute cold hydrochloric acid
Cupro nickels		70-80			20-30				Hydrofluoric acid
Nichrome	15	60						15 Fe	Scales at 1,900°-2,000° F.
Monel		67		0.1	30	1.0	0.15		"Acid" (refinery) corrosion, hydrofluoric acid, chlorine, ammonium chloride, hydrogen fluoride
H Monel (castings)		65		3.0	29.5	0.9	0.1		Hot caustic soda
S Monel (castings)		63		4.0	30	0.9	0.1		Hydrofluoric acid
Inconel	13	79.5		0.25	0.2	0.25	0.08	6.5 Fe,	"Acid" (refinery) corrosion
Hastelloy A		53	22	1		2		22 Fe	Hot conc. sulfuric acid, phenol
Hastelloy B		60	32	1		1		6 Fe	Hot conc. phosphoric or sulfuric acid, ammonium chloride, copper chloride, hydrofluoric acid, and phenol
Hastelloy C (castings)	17	51	19	1		1		6 Fe, 5 W	Hot dilute phosphoric acid, fuming sulfuric acid, calcium hypochlorite, copper chloride, hydrochloric acid, and phenol
Hastelloy D (castings)		85		10	3	1		1 Al	Hot conc. sulfuric acid
Worthite	20	24	3	3.25	1.75	0.6	*0.07		Dilute cold hydrochloric acid and brines
Durimet, Circle L-34 Carpenter 20, etc.	20	29	3.5	1.0	4	*2	*0.07		Cold dilute hydrochloric acid
La Bour (castings)	23	53	4	4	5	0.5		2 W, Fe 8	
Illium R	21	57	5.6	1.0	4	*1.75		W	
Illium G	21	57	6.5	1.0	6.5	*1.6		W	
Nichrome IV	20	80							Scales at 2,000°-2,100° F.

*Maximum. †The Alloy Casting Institute designates its "C" alloys as those primarily to resist corrosion, at temperatures below 1,200° F. The second letter indicates the chromium-nickel type of steel by increasing nickel content from "A" to "X." Thus "F" stands for 19-9 Cr-Ni, "K" for 25-20 Cr-Ni, etc. Numerals following the letters indicate the maximum carbon content. Thus, CF-8M contains only 0.08 carbon maximum and it also contains molybdenum. ‡Several proprietary alloy compositions fall within the chromium-nickel range but contain amounts of silicon, molybdenum, and copper.

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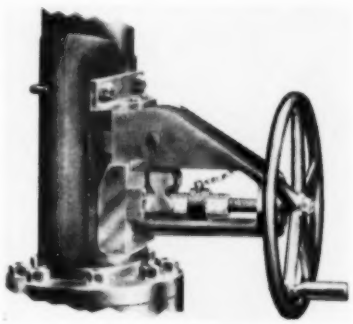
DIGEST OF NEW EQUIPMENT

IT'S NEW — CHECK IT

by Dan B. Miller

1 NEW TYPE Y CONTINUOUSLY CONNECTED SIDE HANDWHEEL is for emergency manual control in case of diaphragm or operating medium failure. Especially designed for use with all B.S.&B. diaphragm control valves, the new handwheel enables a plant to operate on an emergency basis. The basic handwheel assembly has a high-tensile iron frame fitted with oil-impregnated bearings. The handwheel screw is made of nongalling 18-8 stainless steel with a high-tensile aluminum bronze nut for transmitting power through a cast-steel fork to the valve stem. When equipped with the Type Y handwheel, B.S.&B. control valves can be manually positioned in either direction independently of the normal controlling impulses. The handwheel mechanism provides stops so that travel can be set to cover any portion of the complete valve stroke. *Black, Sivalls & Bryson, Inc.*

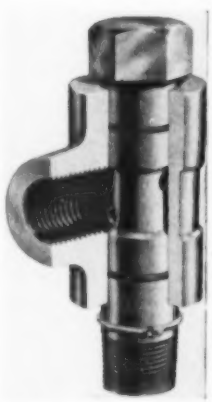


IT'S NEW — CHECK IT

2 IDEAL SPEED SELECTOR is an instrument for selection of most efficient draw-works hoisting speed. It interprets the tension in the dead line and indicates the proper speed ratio for hoisting. It is more easily used than any tabular data would be, being mounted in the weight-indicator panel where it can be read conveniently and easily. Use of the speed selector in hoisting drill pipe will assure the fastest and most efficient operation of the draw works within its rated capacity. Specifically, the speed selector avoids: use of speed ratios which are too high for the load with consequent overloading of chains, clutches, and engines; use of speed ratios which are lower than the load requires, with subsequent loss of valuable time; and use of power beyond the rating of the draw works, on rigs employing extra power for pumping requirements. The instrument is provided with bracket, bolts, built-in pulsation dampener, self-sealing disconnecting couplings, hose, and a tee for installation in the instrument panel. Each speed selector is calibrated for a particular combination of draw works and wire-line anchor. Its use is recommended only for the Ideal types D, E, and F anchors. With the speed selector it makes no difference how many lines are strung on the blocks since the calibration is based on the tension in a single line. *Martin-Decker Corp.*

IT'S NEW — CHECK IT

3 SWIVEL ELBOW facilitates assembly of high-pressure fluid lines. While it was designed especially to provide flexibility in connecting fluid lines to blowout preventers, the swivel elbow can be used to good advantage on any high-pressure fluid line where frequent assembly and disassembly are required. The swivel elbow is not intended for service where continued rotation under pressure is required. A single swivel elbow permits 360° rotation in each of two planes, 90° to one another. A hex is provided on one end of the spindle to permit makeup or breakout of the fitting without disturbing any other connections in the line. Thus, the need for unions in the line is eliminated. The Hycar rubber seal rings are so located that pressure thrust on the spindle is balanced and not transmitted to the line. Rotary and axial freedom of movement eliminates damage due to vibration or pulsation in the line. It also eliminates the need for holding pipe nipple lengths to close tolerances. *Cameron Iron Works, Inc.*



IT'S NEW — CHECK IT

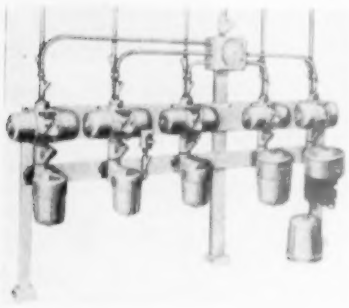
KEEP INFORMED ✓SAVE TIME ✓TEAR OUT CARD ✓CHECK IT ✓MAIL IT

This Digest of New Equipment offers you a quick resume of important features of new or improved products and trade literature and the opportunity to obtain complete information on each subject by use of the convenient "CHECK IT - MAIL IT" service card.

4 NEW EXPANDING SHOE PACKER. Constructed of an extremely strong rubber, much harder than the packer, it is designed to operate efficiently under deep hole conditions. The new device reduces time wasted in attempts to free the packer; lessens the amount of drag going into hole; decreases the number of misruns in oversized holes; and usually comes out of the hole intact minimizing the amount of rubber left downhole. The expanding shoe does these things by preventing the flow of the packer over its packer support. When weight is applied to the packer from above, and the tool opened, the angle at the top of the expanding shoe serves as a wedge. Compression of the rubber forces the expanding shoe out and over the packer support. The expanding shoe meets the packer, effectively preventing it from thrusting down beyond its working limits. A reverse angle holds the expanding shoe at the bottom. The limited compression of the expanding shoe prevents it from having to support the weight of the full mud column. A very high percentage of the load on the packer is supported by its steel support and is transmitted through this steel support to the anchor. Field tests gave very satisfactory results, supporting those made in the lab. On jobs in Wyoming, Oklahoma, Texas, Illinois, New Mexico, Mexico, and Canada, formation tests at all depths proved extremely successful. Tests have been run at depths below 16,000 ft. without leaving rubber in the hole and without difficulty in unseating the packer. *Halliburton Oil Well Cementing Co.*

IT'S NEW CHECK IT

5 NEW U. L. APPROVED CIRCUIT BREAKER, MOTOR STARTER, AND COMBINATION ENCLOSURES. A complete new line of explosionproof, dusttight, raintight circuit-breaker, motor-starter, and line-starter combination enclosures carries U. L. approval, and, with a new approved sealing Unilet, may be joined in combination to meet U. L. requirements in certain sizes. Each component Unilet for circuit breaker, motor starter, and seal possesses full seven-thread engagement at the coupling joints as well as on the bolt-free covers. Absolutely safe entrance to individual motor starters for maintenance work is assured in both single and banked combinations in hazardous areas without shutting off other branch circuits. No live circuit-breaker wires are exposed while the motor-starter enclosure is open on a line-starter combination. Considerable savings are effected by this feature, since there is no unnecessary down time on machines and equipment when these Unilets are installed. Other features include: U. L. approval on banked circuit-breaker Unilets up to groups of three for Forms 1 and 2; lightweight construction for easy installation without use of heavy lift equipment standardized mounting frames for interchangeability of most well-known makes of circuit breakers and motor starters in certain sizes; simplified straight-through wiring; versatile hub adapters which permit use of oversize conduit and conductors; and streamlined push-button and pilot-duty control. The new Unilet line covers all breaker-starter control equipment of leading firms rated to 225-amp. breaker loads and to 100 hp. on three-phase induction motors at 600 volts maximum. *Appleton Electric Co.*

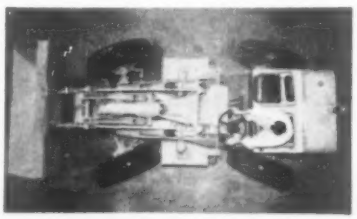


IT'S NEW CHECK IT

6 SEALED TYPE I BOWEN ROTARY JARS are straight-pull mechanical-type rotary jars which provide greater efficiency in jarring operations. The ability of these jars to strike heavy blows with a string completely free from torque eliminates any annoying tendency to release the fishing tool below the jar. Torque-free operation also reduces equipment wear and eliminates hazards. Since these jars are purely mechanical, their tripping mechanisms do not depend upon a series of packing failures, abrasive elements in the circulating fluid or high temperatures. These jars will deliver the same heavy upward blows regardless of whether the string is elevated slowly or with great rapidity. Wearing parts can be replaced easily and economically. The tripping mechanisms are identical with those in the earlier types of Bowen rotary jars. These new jars differ in that they are filled with oil and sealed top and bottom against the ingress of well fluid. With this arrangement the moving parts work in a bath of oil. The floater automatically moves up or down the wash pipe, maintaining pressure balance within the jar, avoiding excessive pressures on the seals. *S. R. Bowen Co.*

IT'S NEW CHECK IT

7 NEW MATERIALS HANDLING SHOVELOADER uses the same steering principle as a hook-and-ladder fire truck to turn sharp corners despite its 19-ft. length. The Shovelloader has an inside turning radius of only 7 ft. 6 in. Equipped with positive four-wheel drive and designed to eliminate need for a center differential in the transfer case, the unit's hi-flotation tires and high under clearance permit efficient operation of the loader under extreme conditions of mud, snow, sand and uneven ground. Power steering on all four wheels (optional) also adds to the operator's critical control of the unit. Operator



PRODUCTION INCREASED 400 BOPD WITH STRATAFRAC TREATMENT

The well still flowed its allowable of 303 BOPD three months after Dowell Service

Dowell used Stratafrac to fracture an old well in a sand formation having high permeability and low solubility. Production was increased from 50 BOPD to 450 BOPD, flowing on a ¼-inch choke. Three months after treatment, the well was still making its allowable of 303 BOPD on a 7/64-inch choke at a tubing pressure of 470 psi.

Stratafrac is used to fracture and acidize formations in *one* operation! Its hydraulic action is designed to extend existing fractures and create new ones. And the acid-kerosene gel (Jel X 500) contains chemicals to dissolve the acid-soluble particles.

The sand used in Stratafrac acts to prop and abrade the fractures, creating lenses of artificial permeability. The amount and size of sand used and the acid concentration of the Jel X 500 can be varied to fit formation characteristics.

A recent trend in fracturing has been the development of batch treatments. In this method, the first slugs of fracturing fluid contain a fine grain sand, and the following slugs contain a coarse grain sand.* The fine grains prop an initial opening in the formation to facilitate the entry of the larger grains which follow in the second batch. This contributes to a larger ultimate fracture permitting easier fluid drainage to the well bore.

For more detailed information about Stratafrac and how it can help increase your oil production, contact your nearest Dowell station at your convenience. Or, write to Tulsa, Dept. B-11.

*U.S. PATENT NO. 2,354,570

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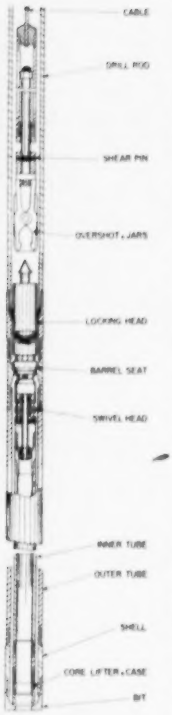
safety is secured by location of the seats at the rear and above the engine, away from all moving parts. This vantage also gives the operator an excellent view ahead. *Baker-Lull Corp.*

IT'S NEW CHECK IT



8 WIRE-LINE CORE-BARREL EQUIPMENT. This small-diameter wire-line equipment has been under continuous development and tests since 1947. A number of small holes have been successfully completed and in depths ranging from 500 to 3,200 ft. Currently, a hole is being drilled which is expected to reach a depth of 5,000 ft. Core recovered with this equipment is approximately 1 1/16 in. in diameter. The string of drill rods is hoisted from and lowered into the drill hole only at such times as it is required to replace the diamond core bit. At the end of each core run, the inner tube, together with the core lifter assembly and the core, is extracted from the hole through the inside of the drill rods by means of a wire-line cable reel. With skilled operators, the extraction of the core-laden inner tube, and lowering of the empty liner tube in a 1,500-ft. hole, requires about 15 to 20 minutes. Round-trip time with the wire-line equipment in a 3,000-ft. hole has been accomplished in 32 to 38 minutes' elapsed time. The core barrel is equipped with a ball-bearing, swivel-type head, and, if desired, with a water-shutoff valve. The instant a core block occurs in the bit or inner tube, the shut-off-valve action prevents the circulation of fluid, alerts the operator, and forces him to pull before core grinding starts. This results in a vastly improved core recovery, decreased diamond loss, and longer life. *E. J. Longyear Co.*

IT'S NEW CHECK IT

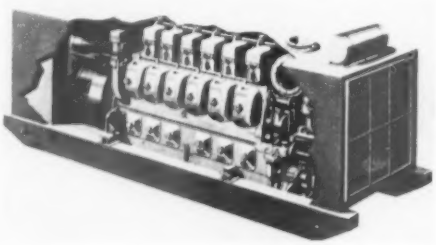
9 AXTRAHARD POLISHED ROD. Over 3 years of research and testing have gone into the development of this new Axtrahard polished rod. It has proved itself under most severe abrasive conditions. Because there is no plating to strip off, Axtrahard also combats corrosion. It is especially adapted to water-flood areas where sand is abrasive and where regular polished rods wear out prematurely. The Axtrahead is a premium polished rod and sells at a premium price. *Axelson Manufacturing Co. Division, Pressed Steel Car Co.*

IT'S NEW CHECK IT

10 MODEL CA PULSATION DAMPENER is designed and engineered for the specific job of reducing line shock in hydrant fueling systems caused by the abrupt closing of the loading valve. This tool protects the fuel flow meter and the filter from damaging vibration, permits accurate reading of fuel flow meter gages, and allows the filter equipment to perform at capacity at all times due to the uninterrupted flow produced by the accumulative ability of the tool. The tool has a surge displacement of 570 cu. in. and is designed for 350 psi. working pressure with a safety factor of four. This unit is tailor-made for reducing shock where surge or vibration is a factor and where working pressures are under 350 psi. The CA pulsation dampener has a body of aluminum alloy. The diaphragm is molded of a Hycar and Perbunen formula. This material functions properly in temperatures ranging from 65° below zero to 200° F., and will withstand the destructive action of high-octane gasoline, jet fuels, and other acid and chemical-content fluids. *Gadco, Inc.*

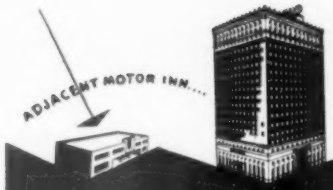
IT'S NEW CHECK IT

11 NEW, COMPACT, PORTABLE DIESEL-ELECTRIC GENERATOR UNIT is for emergency, temporary, or standby service. The generator can be equipped with a 9 by 10½-in., four-cycle, turbocharged Alco diesel in sizes ranging from 390 to 1,300 kw. In addition to the engine, all auxiliary equipment including generator, exciter, and switch gear is mounted on skids so that by merely connecting the power cables, the unit is ready for operation. Equipped with all necessary auxiliary equipment, the



portable diesel-electric generator can be moved quickly and installed for all types of service. Thermostatic control of the radiator shutters is furnished to maintain the required jacket-water temperature, and an expansion tank mounted above the radiator provides cooling-water capacity. Alternating or direct-current generators can be provided with standard voltages. Starting air of 150 psi. pressure is supplied by a gasoline-engine-driven air compressor. The design of the Alco portable generator can be adapted to pipe-line service by substituting setup gears and pumps for electric-generating equipment. *American Locomotive Co.*

IT'S NEW CHECK IT



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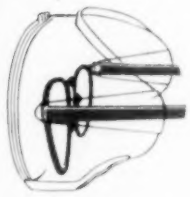
Workers who wear prescription glasses—even the new, big plastic frames—will welcome its extra roominess. Transparent frame is tinted light green to keep out glare, but admits adequate side light. Clear or green plastic lenses are securely held in place by a deep channel and closed "tab pocket".

Ask your Willson distributor to show you the new No. 90A Series MonoGoggles, available with either direct or indirect ventilated frames or non-ventilated styles. Or write for bulletin.



Side view shows molded-in grooves in sides of frame provide ample clearance for spectacle temples—removes interference with eye glass comfort.

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TRADE LITERATURE

For Copies of These Informative Brochures, Check the Corresponding Number on the TIME SAVER CARD

12 INDUSTRIAL PRODUCTS CATALOG. A new edition of a 40-page catalog offers essential data on the following groups of products: insulations, refractory products, asbestos cement pipe, packings, gaskets, electrical products, frictional materials, roofing, siding, flooring, partitions, and ceilings. Photographs, diagrams, and text have been revised and brought up to date. *Johns-Manville.*

13 HEAT UP STEAM EIGHT TIMES FASTER. A new four-page catalog tells operators of steam-using units how to bring them up to maximum capacity eight times faster. It discusses the new Super-Silvertop Heat-Kwik Steam Traps which vent air from steam units eight times faster than ordinary inverted bucket traps. The folder states that the use of these traps enables the user to obtain more production from steam units, lower steam consumption, longer trap life, and a reduction in the trap capacity factor. *V. D. Anderson Co.*

14 PARACOIL BOILER WATER SAMPLE COOLER NO. 75 is a new four-page illustrated Bulletin No. 110. In addition to the design specifications, a set of charts is included to determine cooling-water flow rate for various sample temperatures. Additional features include typical piping hookups and detailed instructions on the installation and operation of the cooler. *Davis Engineering Corp.*

15 NEW CENTRIFUGAL PUMP CATALOG. This all-new Tri-Clover pump catalog, No. 253, is a valuable aid to the proper selection and application of corrosion-resistant pumps. It is complete with engineering data, performance curves, capacity charts, and seal application. These stainless pumps feature an exclusive construction which permits fast, easy pump assembly and disassembly. They have patented screw type impellers with fast releasing impeller clips and lightweight heads with a minimum of parts. *Tri-Clover Machine Co.*

16 1954 INSTRUMENT TRANSFORMER BUYER'S GUIDE contains basic, up-to-date information on the complete General Electric line. The fully illustrated, 96-page publication, GEA-4626G, contains ratings, ASA accuracy classifications, and prices of all G-E indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, together with tables covering the mechanical and thermal limits of current transformers, are included. *General Electric Co.*

17 BOLINDER 1051/IK is a 2-color data sheet covering an 11 b.hp. 1,500 r.p.m. stationary diesel engine. Sheet covers recommended applications; combustion system; cylinder block, head, and liner; fuel, cooling and lubricating systems; and power take-off. *Bolinder-Munktell.*

18 IDEAL CONSOLIDATED TYPE 110 RIG, rated at 1,100 hp., for medium-to-deep drilling is presented in Bulletin 404. Included in this 20-page booklet are many illustrated construction and operating features, specification tables, and large dimensional diagrams. *National Supply Co.*

19 "DESIGN OF HOT TAP TEE CONNECTIONS IN HIGH-PRESSURE PIPE LINES" A.S.M.E. Paper No. 53-PET-31 was recently presented by Taylor Forge engineers at the eighth annual petroleum division conference of American Society of Mechanical Engineers. This paper deals with the problem of making branch connections to highly stressed transmission and distribution lines without interruption of fluid flow, which is often encountered in the gas, oil, chemical, and other industries. A design approach aimed at keeping the stress levels around branch connections in harmony with the stress levels common in high-pressure pipe lines is suggested. *Taylor Forge & Pipe Works.*

20 FAGEOL L.P.G ENGINES. Printed in two colors and suitable for punching to fit standard three-ring binders, the six-page bulletin covers horizontal and vertical models of the 404, 451, and 477 cu. in. Fageol L.P.G. engines. Bulletin L-8679 is profusely illustrated with photographs, cutaway and section views, horsepower and torque curves, dimensional drawings, and condensed specification data. *Fageol Products Division, Twin Coach Co.*

21 BOWEN ITCO HYDRAULIC JAR. A new six-page descriptive folder on the Bowen Itco Hydraulic Jar shows uses, construction, and operation of this adaptable and efficient tool. A list of the tool's advantages, its design, and principles of operation are covered, as well as drawings of the tool, components, and prices for sale or rental are included. *Bowen Co. of Texas, Inc.*

22 DOWELL PETROFRAC, a four-page, two-color brochure describes equipment and methods employed to increase production by formation fracturing. Of particular interest is a table of actual treatment results covering a wide variety of oil-field conditions. *Dowell Incorporated.*

23 SUPERIOR INSULATION. Unibestos pipe and block insulation, Foamglas insulation, Uni-Ells, Eagle "66" insulating cement, Eagle one-coat, Clima-Seal .025 Vaporseal, Overkote weathercoating, and other insulating and allied materials are described in a 28-page multicolor brochure. Technical data on each product are included. *The Aber Co.*

24 STORAGE-TANK AND TANK-CAR VALVES. Annotated line drawings, application suggestions, parts index, and data tables are shown on each of a full range of storage-tank and tank-car valves. Installation and servicing instructions are also included. *American Car & Foundry Co.*

25 FREON COMPRESSOR BULLETIN. Freon compressors for all refrigeration applications are the subjects of a new Bulletin C-1100-B30C. The bulletin describes the freon compressors and includes detailed cutaway drawings to show the internal parts. The freon compressors are also shown incorporated in self-contained compressor units for use with remote condensers and self-contained condenser units utilizing shell-and-tube water-cooled condensers. The bulletin contains dimensions and data on all eight models of the freon compressor, eight models of the compressor units, and eight models of the condenser units. *Worthington Corp.*

26 PROCESS CONTROL INSTRUMENTS. The catalog lists a variety of flow meters, recorders, controllers, pressure regulators, sight flow indicators, and chemical feeders, giving discounts from list price as well as additional quantity discounts. Complete instrument specifications are clearly set forth. Sizing nomographs for the two most common types of Flowrator meters are also given covering both liquid and gas service. *Fischer & Porter Co.*

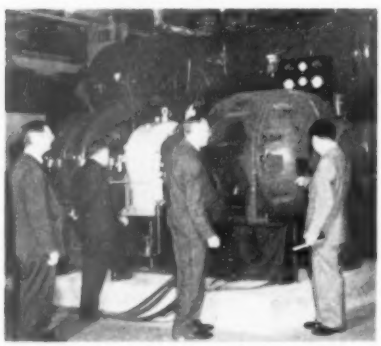
EQUIPMENT MEN . . . in the News

Nelson Electric Opens Oklahoma City Branch

Nelson Electric Manufacturing Co. Tulsa, has announced the opening of an Oklahoma City office to service central and western Oklahoma, as well as the Texas Panhandle.

Jack R. Jacobs has been named sales representative and will maintain his office at 5308 North MacArthur Boulevard. Jacobs transfers to Oklahoma City from Tulsa where he has been Tulsa city salesman. Nelson Electric is now in its sixteenth year of operation, and manufactures electrical equipment such as explosionproof motor controls, junction boxes and enclosures, circuit breakers and lighting panels, oil-field motor controls, automatic pipe-line sampling devices, cathodic protection equipment, instrument and control panels, and unit substations.

Aramco Officials Inspect Centrifugal Equipment



Engineers of Arabian American Oil Co. recently visited Harrison Works of Worthington Corp. to observe tests on the giant centrifugal refrigeration machine pictured here. The equipment will provide cooling for a central air-conditioning system at one of the Aramco installations in Saudi Arabia. The centrifugal compressor is driven by an 800-hp. motor and will provide 600 tons of refrigeration. Seen inspecting the equipment at Harrison Works are, left to right: F. S. Rich, instrumentation engineer, Aramco; W. C. Dayhuff, chief process engineer, New York, Aramco; H. E. Wood, assistant general manager, export department, Worthington; and E. H. Hong, process engineer, Aramco.

Bethlehem Supply Holds Managers Meeting in Tulsa

Attending Bethlehem Supply's management meeting at Tulsa were, bottom row: H. A. Barnes, Tulsa; E. A. Buxton, Bethlehem; B. C. Macgregor, Pittsburgh; N. R. Downie, Bethlehem; R. A. Johnson, Wichita; R. L. Timmons, Tulsa; Harry Marlow, Beaumont, Tex.; H. M. Cooley, Tulsa; J. C. Miller, Bethlehem; L. R. Estes, Corsicana, Tex.

Second-from-bottom row: C. C. Crider, Tulsa; A. Schwartz, Lebanon, Pa.; W. M. Jones, Los Angeles; V. R. Blackwell, Wichita; I. C. Smith, Tulsa; W. T. Davis, Oklahoma City; J. F. Eaton, Tulsa; D. C. Roscoe, Bethlehem; G. A. Tompson, Tulsa; V. W. Bailey, Tulsa; C. W. Wilmeth, Tulsa; J. C. Knoll, Fort Worth; E. S. Lewis, Casper; G. L. Reid, Tulsa; C. R. McNair, Tulsa; E. H. Gumbart, Jr., Chicago.

Third-from-bottom row: B. S. Matthews, Tulsa; H. S. Sutton, Pampa, Tex.; Bruce Ramage, Houston; J. S. Worth, Bethlehem; N. B. Heywood, Tulsa; T. W. Simpson, Tulsa; A. Weber, Jr., Midland; R. W. Neal, Tulsa; J. R. B. Freeman, Los Angeles; R. F. Hurst, Houston; I. D. Adkison, Tulsa; T. C. Graham, Corpus Christi; J. E. Sultis, Tulsa; W. F. Taylor, Tulsa; K. C. Winston, Casper; R. L. Collins, Tulsa; H. E. Davidson, Tulsa.

Third-from-top row: H. L. Hawkinson, Jr., Tulsa; W. J. Brady, Houston; F. R. House, Dallas; J. V. Spalding, Houston; J. B. Elizey, Harvey; W. B. Cotton, Tulsa; J. J. Lovell, Tulsa; C. W. Pickering, Los Angeles; W. E. Freeman, Tulsa; W. W. Johnson, Houston; W. E. Stephenson, Wichita Falls; H. W. Robinson, Los Angeles; J. G. Floyd, Shreveport; H. R. Klein, Tulsa; T. W. Thurmond, New York; O. H. Crowe, Houston; H. M. Flynn, New York; H. V. Harder, Tulsa.

Second-from-top row: J. E. McLean, Tulsa; Christian Seger, Jr., Tulsa; W. A. MacMullen, Los Angeles; H. H. Patton, Bethlehem; H. E. Redden, Corsicana, Tex.; F. C. Batson, Tulsa; G. B. Sager, Salem, Ill.; H. R. Powers, Tulsa; Gene LaSchober, Bethlehem; L. A. Myers, Tulsa; H. A. Wilson, Tulsa; T. W. Armstrong, Williamsport, Pa.

Top row: J. L. Shafer, Jr., Tulsa; F. I. Mobley, Tulsa; R. M. Berman, Tulsa; R. A. Day, Tulsa; Ford Carman, Tulsa; Lee Fagg, Tulsa; C. M. Steph, Tulsa; C. P. Nafus, Tulsa; J. A. Dudley, Tulsa; L. C. Torell, Bethlehem; Clay Underwood, Tulsa; J. I. Banes, Tulsa; H. E. Arnold, Tulsa.

Bethlehem Supply Co. held its annual manager's meeting in Tulsa, January 18 to 22, inclusive. The meeting was highlighted by the presence of D. C. Roscoe, assistant general manager of sales, Bethlehem Steel Co. Also in attendance from the home office of Bethlehem Steel Co., Bethlehem, Pa., were: E. A. Buxton, manager of sales, pipe and tubes; N. R. Downie, manager of sales, wire rope and strand; J. C. Miller, manager of sales, sucker rods and alloy studs.

Other Bethlehem Steel officials in attendance included: B. C. Macgregor, general manager central sales, with headquarters in Pittsburgh; R. E. Burns manager of sales, St. Louis; R. F. Hurst, manager of sales, Houston; E. H. Gumbart, Jr., manager of sales, Chicago; H. M. Flynn, Bethlehem Steel Export Corp., New York; Harry Marlow, Gulf Coast Shipbuilding Division, Beaumont, Tex.

The out-of-town representatives of Bethlehem Supply Co. in attendance included all division managers, resident managers, district managers, Wendell M. Jones, vice president, Los Angeles; and J. R. B. Freeman, general manager of sales, Los Angeles.

J. & L. Supply Division Opens Newcastle Store

Rainey Elliott, general manager of Jones & Laughlin Steel Corp., supply division, recently announced the opening of a new oil-field supply store at Newcastle, Wyo.

The new store, eighty-seventh in the supply division's list of field operations, becomes the fourth store point in the recently expanded southern Rocky Mountain district.

Robert R. Brown, formerly store manager at Laurel, Miss., has been transferred in the same capacity to Newcastle, and will be assisted by Lester L. Reed and Lean E. Arm-

strong, salesmen; and Donald M. Thorwart, Eddie H. Hendricks, and Paul C. Owens, storemen.

Doyne Carson is district sales manager of the southern Rocky Mountain district with headquarters in the corporation's new warehouse building, at Denver.

Wozar Is Dayton President

Louis Wozar, who 5 years ago became assistant to Frank M. Tait, president of Dayton Pump & Manufacturing Co., has been named president and general manager of the company. Tait, one-time associate of Thomas A. Edison, who founded the company in 1908, was elected chairman of the board.

Rasmussen Facilities Sold, Ramsco Corp. Organized

R. A. Newton, former partner and general manager of Rasmussen Manufacturing Co., for 10 years, L. A. Theisen, formerly vice president and sales manager of Falcon Products, for 8 years, and W. G. Wellington, formerly vice president and chief engineer of Falcon Products, for 8 years, have recently purchased the plant and equipment of Rasmussen Manufacturing Co., Hollydale, Calif.

The plant will operate under the name of Ramsco Corp., and will continue to manufacture the same products, namely, engine liners and sleeves, Enterprise engine parts, oilfield specialities, and general machine work. Ramsco will also add heat-treating and plating departments to present facilities.

Ramsco has been appointed an authorized distributor for Roebling wire rope, slings, and fittings.

L. A. Theisen, W. G. Wellington, and R. A. Newton.

Mission To Study Fluid End Slush Pump Parts

This test pump, lower right, has recently been set up at Mission Manufacturing Co. for study and development of improved fluid end slush pump parts. Parts are tested in a 7½ by 14, HP-14,000 Wheland pump connected to a V125 Climax engine, and operated under actual field conditions. The test setup includes a standard-size mud pit and metal tanks. Old mud taken from field pits containing cuttings and high sand content is used to duplicate actual conditions. A cooling tower with cooling coils in the mud tank controls the mud temperatures. The unit is housed in a metal building. It is on a 24-hour operation with automatic controls. The unit operates at temperatures up to 140° which is higher than average normal field conditions and at pressures in excess of 1,500 psi. Several groups from major oil companies have visited the Mission plant recently to see the new test stand demonstrated. A group from Gulf Oil Corp., upper left, included: H. Ben Young, of Mission; B. G. Frazier; Shad Mims, of Mission, M. R. Redrick, Richard White, of Mission; C. J. Rodgers, Jack Stewart, of Mission; and J. A. Perkins, Jr. Shell Oil Co. employes, upper right, who inspected the test stand were: Fritz Haselker, Jim Lewis, H. E. Arnold, Richard White, and H. Ben Young, of Mission; J. A. Burgbacher, G. D. Oates, C. O. Bell, of Mission; W. S. Phillips, and J. S. Steward, of Mission. A group from Humble Oil & Refining Co., lower left, who visited the plant with Mission and Wheland officials, included: H. M. Lemex, H. Ben Young, and Miller Sparks, of Mission; Charles Dunlop, George Campbell, of Wheland Pump Co.; C. O. Bell, of Mission; Tucker Pennington, Neil Taylor, Dudley Sharp, of Mission; J. W. Rhea, W. M. O'Reilly, and G. E. Cannon.

O-C-T Names Smith to Natchez, Miss., Area

FRANK SMITH

Frank Smith has been appointed Oil Center Tool Co. sales representative in the Natchez, Miss. area, Ross Spencer, O-C-T sales manager, has announced.

Smith has recently returned to O-C-T after a year's service in the Army Air Corps. He was a salesman for O-C-T in West Texas with headquarters in Odessa.

Campbell Made McCullough Sales Engineer at Houma

K. K. CAMPBELL

K. K. (Kibby) Campbell has been appointed sales engineer at the Houma, La. branch of McCullough Tool Co., according to an announcement by O. J. McCullough, vice president.

Campbell is a 1942 graduate of Louisiana State University.

PIPE LINES

New Gas Line Planned

Tennessee Gas to build 574-mile, 30-in. line from Louisiana paralleling existing system to Tennessee

HOUSTON.—Plans for a new 574-mile, 30-in. line, increasing transmission capacity for Gulf Coast natural gas to the Northeast, have been announced by Tennessee Gas Transmission Co.

The new line was included in 637 miles of line planned for this year by Tennessee Gas, according to Charles S. Coates, senior vice president of the firm.

Coates said the new 30-in. line will begin at the company's compressor station near Kinder in southwestern Louisiana and will roughly parallel the company's existing 24, 26, and 30-in. system through Louisiana, Mississippi, and Tennessee, joining the existing system at a compressor station near Portland, Tenn., at the Tennessee-Kentucky state line.

The new 30-in. line would begin at the junction of a Louisiana Gulf Coast gathering system with an existing 20-in. lateral to the main system, making available dual transmission outlets for the Louisiana gas.

Other plans . . . The construction program this year also includes the construction of two new compressor stations, enlargement of five of the existing 26 stations, and construction of 63 miles of 26-in. line paralleling sections of the existing system in Ohio and Pennsylvania.

The 26-in. line will be laid between the Ohio River and a compressor station near Mercer, Pa.

W. C. McGee, Jr., vice president and general superintendent of operations, reported that the pipe-line construction program will start about June 1, and completion is scheduled "well in advance" of the start of the winter heating season.

New capacity, for which no exact figure has been released yet, will make additional gas available to the company's customers along the system, longest in the country.

The Tennessee Gas system begins near the Rio Grande River at the Texas-Mexico border and runs northeast more than 2,000 miles to New England.

New compressors . . . E. S. Murray, chief engineer, detailed the compressor-construction phase of the program, as follows:

. . . A new station, No. 313, to be constructed near Coudersport, Pa., adjoining Hebron storage field, to be powered by five 1,320-hp. engines.

. . . A new station, No. 224, to be built near Findley Lake, N. Y., on the main line to Buffalo, to be powered by five 1,320-hp. engines.

. . . Enlargement of five existing stations—No. 17 at East Bernard, Tex., by 3,200 hp.; No. 25 at Cleveland, Tex., by 4,800 hp.; No. 32 at Jasper, Tex., by 1,600 hp.; No. 40 at Natchitoches, La., by 4,800 hp.; and No. 71 at Middleton, Tenn., where a 1,320-hp. engine is being installed and is scheduled to be available for service early this year.

Portland - Montreal System Capacity Expansion Planned

PORTLAND, Me.—Plans for expansion of Portland - Montreal Pipe Line System's capacity from 158,000 to 190,000 bbl. per day have been announced by F. C. Schultz, president of Portland Pipe Line Corp.

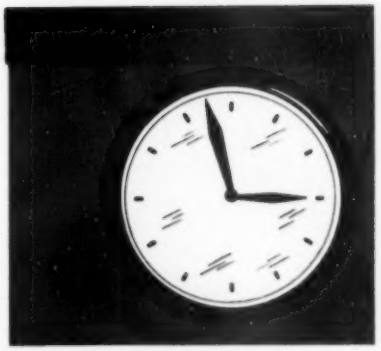
The capacity will be increased by construction of four new intermediate pump stations for an eight-station operation on the 18-in. line between South Portland, Me., and Montreal East, Que., Canada. No change is contemplated on the 12-in. line of the system, which will continue with four-station operation.

Completion of the expansion project is scheduled for November 1.

Portland-Montreal Pipe Line System supplies four Canadian refineries located at Montreal East with crude brought by tanker to South Portland. The U. S. portion of the system is owned and operated by Portland Pipe Line and the Canadian portion by Montreal Pipe Line Co., Ltd.

Portland Pipe Line will own and operate three of the new stations to be built at Raymond, Me., Gorham, N. H., and Sutton, Vt. Each will have one 500-hp. and two 1,000-hp. centrifugal pumping units.

Increased pumping capacity at the three present U. S. stations will be obtained by increasing the plunger dis-



TIME SAVING SERVICE

placement on four of the triplex pumps at each station.

The fourth new station will be built and operated by Montreal Pipe Line at St. Cesaire, Que., Canada. It will have one 600-hp. and two 1,200-hp. centrifugal pumping units.

An additional 1,000-hp. centrifugal unit will be installed at the present Highwater, Canada, station to give a total of 2,750-hp. on the 18-in. line at the station to match the increase made possible by the new stations.

Proposed North Dakota Gas Line Scheduled for Hearing

BISMARCK, N. D. — An application by North Dakota Natural Gas Transmission Co. for the construction of a 500-mile, $12,500,000 natural-gas-transmission line will be held by the North Dakota State Public Service Commission February 2.

The firm, headed by Emmett Butler of St. Paul, Minn., last fall contracted with Amerada Petroleum Corp. for purchase of gas from North Dakota's Tioga and Beaver Lodge fields, where Signal Oil & Gas Co. is building a gasoline plant *(The Oil and Gas Journal, November 30, page 46)*.

The company proposes to build a 12-in. line from the Signal plant near Tioga eastward to Minot and on to Fessenden. There the line would fork, with one 10-in. line extending north to Devil's Lake on to Grand Forks, and the other leg to run southward to Jamestown and Fargo, with an 8-in. line running to Wahpeton.

Initial capacity of the line would be 30,000 M.c.f., with provision for later increasing it to as high as 60,000 M.c.f.

Signal's gasoline plant, the first in North Dakota, is scheduled to be in operation by summer and is designed to process 40,000 M.c.f. of gas daily.

Pasotex to Complete Crude Line This Week

EL PASO, Tex.—Pasotex Pipe Line Co. expects to complete its 153-mile, 10-in. crude line from Snyder to Wink, Tex., this week.

McVean & Barlow, Odessa, Tex., started work on the line on December 1 with two spreads, one starting at Wink and the other at Snyder.

The line is designed for a maximum throughput of 23,000 bbl. per day. However, the company said initial pumpings will approximate 12,000 bbl. per day.

The new system will transport Scurry County sweet crude to the firm's existing 8-in. crude line at Wink. From

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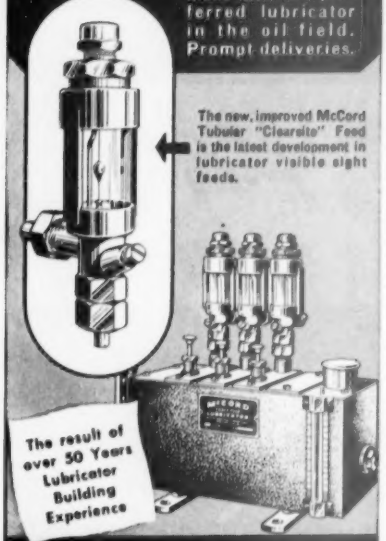

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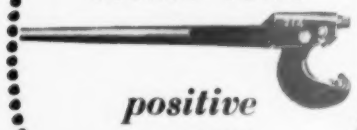

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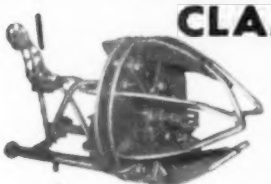

This popular hand-operated internal lineup clamp is designed to give trouble-free operation under all operating conditions. You get perfect alignment and continuous uninterrupted stringer bead that eliminates pinholes and weak welds due to tacking. Costly stringer bead cut-outs due to misalignment are eliminated. Made in 10 sizes for pipe from 12" to 36".

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there the crude will be transported to the 28,000-bbl. Standard Oil Co. of Texas refinery at El Paso *(The Oil and Gas Journal, August 31, page 150).*

Orchard Plans New 45-Mile Crude Line in Colorado

DENVER, Colo.—Orchard Pipe Line Co. has filed application with the Colorado Public Utilities Commission for construction of an $811,250, 8-in. crude oil pipe line from Orchard to Merino in northeastern Colorado.

The 45-mile line proposed by the newly formed company would have a daily capacity of 20,000 bbl. of crude.

It would transport oil from Masters field in Logan County, Colorado, to about 4 miles northwest of Orchard, to a connection with Sterling Pipe Line System at Merino for transmission to North Platte, Neb., and points east.

A lateral from the proposed line would carry crude from Masters field to Orchard for loading on trucks and railroad cars.

Orchard Pipe Line has been incorporated by C. A. Bresnahan, Ray Brannaman, and Ted Bach of Denver.

Rate Increase is Granted

WASHINGTON. — A suspended $6,508,000 annual wholesale natural-gas rate increase by Colorado Interstate Gas Co. has been made effective January 1 by the Federal Power Commission.

The increase is subject to the filing of an undertaking by the company to assure the refund of any excess charges to its customers.

The requirement for the filing of the written undertaking represents a change in the policy of the FPC, which in the past has required bonds to be furnished by the companies when rate increases were put into effect—subject to refund—at the end of the suspension period under the Natural Gas Act.

A.G.A. Conference Set

NEW ORLEANS.—The second Gas Supply, Transmission, and Storage Conference, sponsored by the operating section of the American Gas Association, will be held here March 4-5.

Luncheon conference during the 2-day meeting will be devoted to communications, compressor stations, large-volume gas measurement, pipe line, underground storage, dehydration, dispatching, natural-gas production, and pipe-line construction.

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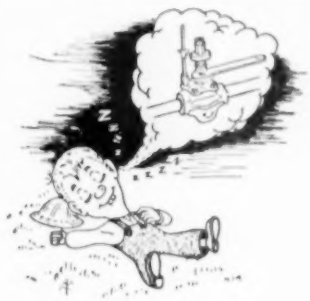

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REFINING

Expansion Started

Kerr-McGee begins work at Wynnewood refinery

TULSA, Okla. — Construction work has started on a $4,500,000 expansion program at Kerr-McGee Oil Industries, Inc.'s, Wynnewood, Okla., refinery. The project is scheduled for completion by November 1.

The program will include construction of a new crude unit to increase the present crude capacity from 9,000 to 15,000 bbl. per day. Koch Engineering Co., Inc., of Wichita, Kans., has the contract for this phase of the work.

The crude unit, including new fractionating towers, a new crude heater, and other equipment, is scheduled for completion by April 1.

Refinery Engineering Co., Tulsa, has contract for construction of a 6,000-bbl. per day fluid catalytic cracking unit, a catalytic polymerization unit, and a gas-condensate unit. Work on these units will begin April 1, with completion to coincide with completion of the expansion program.

The catalytic cracking unit and the catalytic polymerization unit will be constructed under license agreement with Universal Oil Products Co. of Chicago.

The refinery project also includes construction of about 500,000 bbl. of additional tankage, additional steam-generating equipment, a water-treating plant, and other general refinery facilities for which contracts have not yet been announced.

Products from the refinery not marketed in Oklahoma will be transported to the Mississippi River at Memphis, Tenn., by Oklahoma-Mississippi Products Pipeline Corp. *(The Oil and Gas Journal, October 19, page 190)* for shipment on the Inland Waterways System.

Work is currently under way on the 475-mile, $20,000,000 line which will move products from Wynnewood and Sunray Oil Corp. refineries at Beckett and Allen via Fort Smith and Little Rock, Ark. to Memphis.

Construction Started on New Ultraforming Unit

TEXAS CITY, Tex.—Pan American Refining Corp. has started construction on its new 21,000-bbl. Ultraforming unit at its 135,000-bbl. refinery here.

Ultraforming is a new catalytic reforming process developed by Standard Oil Co. (Ind.) *(The Oil and Gas Journal, November 16, page 186)*. M. W. Kellogg Co. is contractor for the new Pan American unit.

Ultraforming differs from other platinum catalyst units in the addition of a reserve or "swing" reactor which successively takes the place of each of the other cases during catalyst regeneration.

Pan Am said two smaller units are under construction at El Dorado, Ark., and Wood River, Ill., refineries.

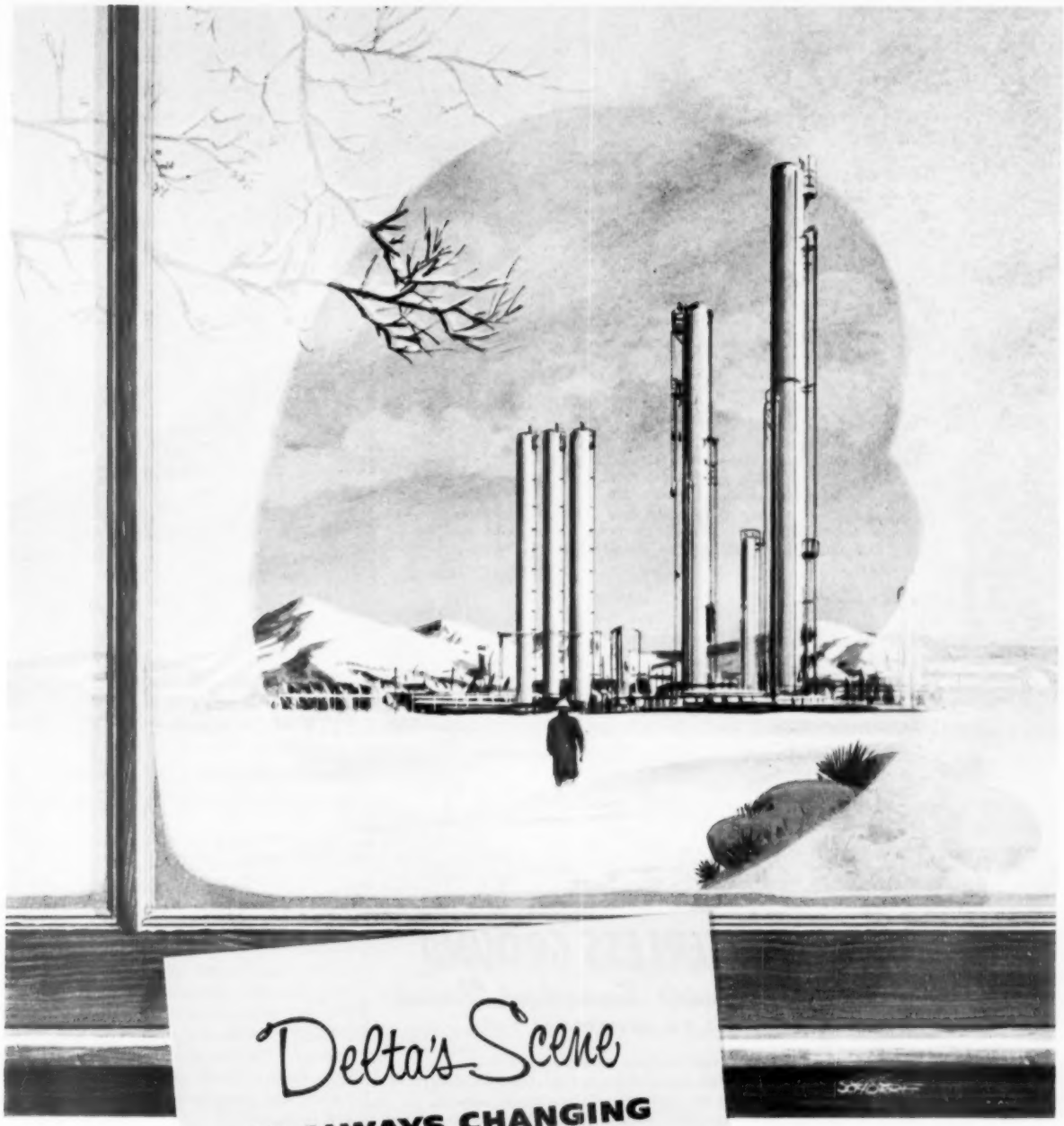
NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue each month.
Explanation—"News Items That Appear in Quarterly Cost Indexes," July 7, 1952, pages 105 and 106.
Compiled by W. L. Nelson—Petroleum Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July and October.

INDEX (1946 = 100)

[illegible]	1948	1949	1950	1951	1952	Oct. 1953
Pumps, Compressors, etc.	127.0	135.9	138.2	155.9	155.6	166.8
Electrical Machinery	127.6	130.9	134.9	154.3	152.4	160.3
Internal Combustion Engines	116.9	124.8	126.0	146.1	146.5	149.6
Instruments	120.0	123.1†	127.8	142.3	146.2	155.0
Heat Exchangers	130.0	133.0	140.0	152.0	165.8	179.5
Miscellaneous Equipment Average	*122.1	*121.6	*126.2	*145.1	153.3	162.0
Materials Component	139.3	143.6	149.5	164.0	164.3	175.5
Labor Component	128.0	137.1	144.0	152.5	163.1	178.9
Refinery Construction Index	132.5	139.7	146.2	157.2	163.6	177.5

*Used in computing the Nelson Index until April 1952. These are slightly different than the average of the Miscellaneous Equipment Items shown above.
†Corrected value.



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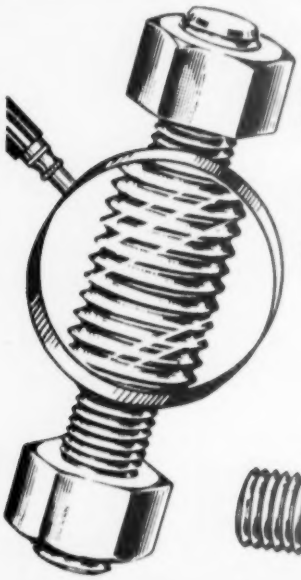

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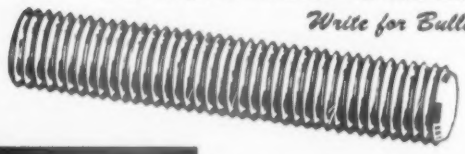

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Skelly to Build New Cat Reformer at El Dorado

TULSA, Okla.—Skelly Oil Co. has announced plans for construction of a 7,500 bbl. per day catalytic reformer at its El Dorado, Kans., refinery, to operate in conjunction with existing facilities at the plant.

The design, engineering, and construction work on the unit, to be built under license arrangement with Universal Oil Products Co., will be done by Skelly.

Crown Central to Add 5,000-Bbl. Houdriformer

HOUSTON, Tex. — Crown Central Petroleum Corp. has concluded arrangements with Houdry Process Corp. of Philadelphia, Pa., for a $1,495,000, 5,000-bbl. per day Houdriformer.

Blaw-Knox has the contract for the construction of the catalytic reformer and other facilities at Crown Central's 25,000-bbl. per day refinery near here. Completion is scheduled for October 1954.

Petrochemicals

First U. S. Plant on Stream To Make Phenol from Cumene

RICHMOND, Calif.—The first commercial plant in the United States and the second in the world to manufacture synthetic phenol from cumene has been put in operation here by Standard Oil Co. of California.

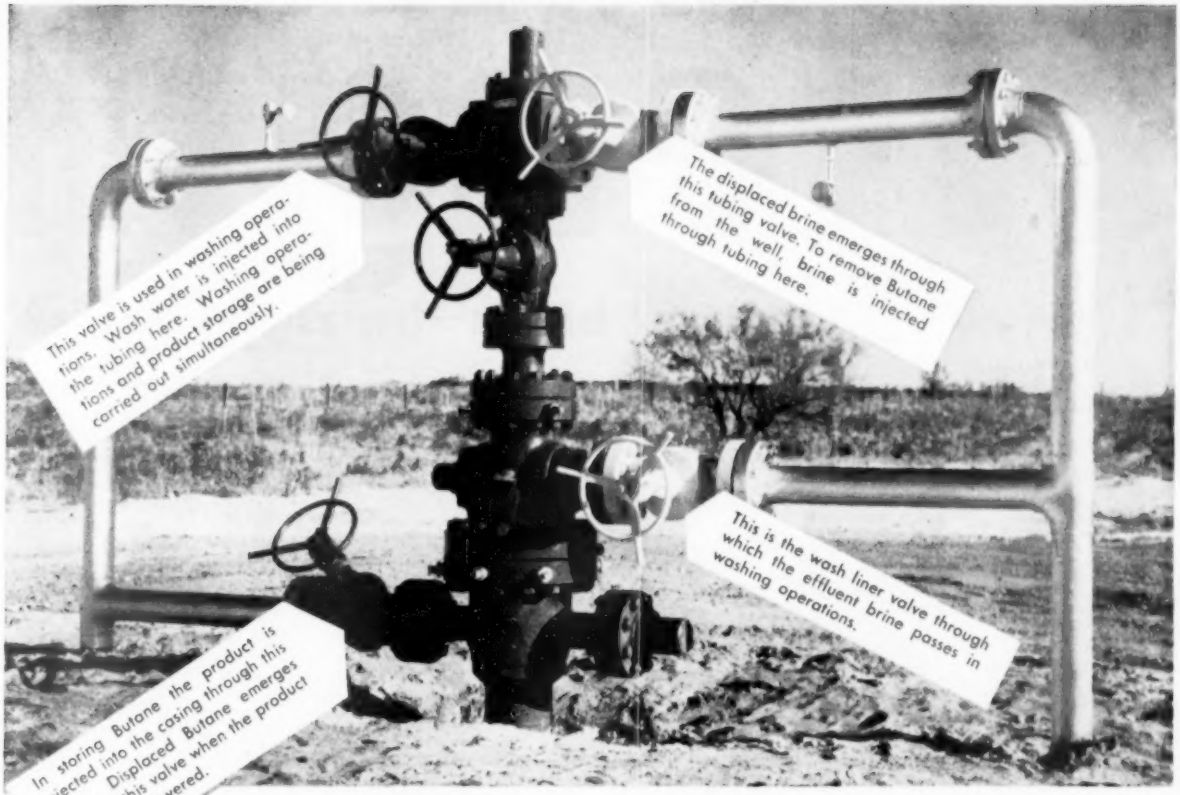
The $4,000,000 plant will be fed with cumene produced at a 200,000-bbl. per year plant at the El Segundo refinery, which went on stream last November. The cumene plant uses benzene from a plant placed in operation earlier and propylene from other refinery units.

The new plant will produce 35,000,000 lb. of phenol and about 20,000,000 lb. of acetone per year.

The cumene is used solely as a feed stock for the production of synthetic phenol, and no chlorine or sulfuric acid is used in the process. Acetone is produced as a coproduct.

The cumene is oxidized with air to form cumene hydroperoxide, which is converted to phenol and acetone.

The first plant in the world for the commercial manufacture of synthetic phenol from cumene was put on stream at Montreal, Canada, by British American-Shawinigan, Ltd. *(The Oil and Gas Journal, September 14, 1953, page 136).*


This valve is used in washing operations. Wash water is injected into the tubing here. Washing operations and product storage are being carried out simultaneously.
The displaced brine emerges through this tubing valve. To remove Butane from the well, brine is injected through tubing here.
This is the wash liner valve through which the effluent brine passes in washing operations.
In storing Butane the product is injected into the casing through this valve. Displaced Butane emerges through this valve when the product is being recovered.

ORBIT Forged Steel VALVES

On Butane Storage Well Hook-up

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Orbit Forged Steel LP Gas Valves are available in sizes: 1", 1½", 2", 2½", 3" and 4" ASA ratings beginning at 150 lb., to and including 2500 lb. flanged and screw end, full opening, carbon steel trim or stainless steel trim. Maximum rated working temperature 250 degrees Fahrenheit.

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Among the Drilling Contractors

Tyler Contracting Firms Increase Own Production

Delta Drilling Co. and Delta Gulf Drilling Co., affiliated drilling contracting and operating companies, headquartering at Tyler, Tex., report a series of newly completed successful wells drilled for their own accounts or in partnership with other operators.

Among their completions is a discovery gas producer, drilled by Delta Gulf at 1 Kalinec, in the La Vaca Grant, 3½ miles west of Alice, in Jim Wells County, South Texas. The well, on a block of 1,350 acres, is esitmated good for 13,000,000 cu. ft. of gas and about 20 bbl. of condensate per day from an upper Yegua sand with casing perforated at 7,705-25 ft. It was drilled to 8,456 ft.

Delta Drilling Co.'s new completions include a confirmation well (1 Hustead) for its recent Bacon lime oil discovery south of Malakoff, in southwestern Henderson County, East Texas. The new well is 1,500 ft. northeast of the discovery, producing from a depth of 7,520 ft.

The latter company has just completed its fourth gas producer in its new Gas Rock area northwest of the original Epps gas field, of West and East Carroll parishes, in northeastern Louisiana, where production is found at depths of 2,300 ft.

In partnership with Ashland Oil & Refining Co., this company has just completed another good producer in Jameson field, Coke County, West Central Texas. This well, 1 Witt et al, producing from two sands in the Strawn formation, gaged 342 bbl. of oil per day through 12/64-in. choke on potential test. It also has another new partnership well, Kinard Oil Co. 1 Mason, in East Schuler field, Union County, Arkansas.

Delta Gulf's new contract jobs include a well for Humble Oil & Refining Co. in the Spurger area of Tyler County, East Texas, and one for Forest Oil Co. in the East Goldsmith area, Ector County, West Texas.

Brown Drilling Co., Long Beach, Calif., is drilling General Petroleum Corp.'s second well in the Beehive Bend area, of Glenn County, in northern California. The new operation, 1 Navarro, in 26-19-2, follows the discovery of gas production in the recent completion of the company's first well, 1 McGowan, 6,000 ft. to the southeast. Gas production was established in sands at 3,650 ft. and 4,950 ft.

Blackstock Gets Position With Schafer Drilling Co.

Harry Blackstock, Jr., formerly drilling superintendent for Dirickson & Lewis Drilling Co., Tulsa, the past 4 years, has joined the organization of Schafer Drilling Co., Oklahoma City, as assistant drilling superintendent. He will reside in the latter city, while Oscar H. Prince, drilling superintendent, will continue to headquarter at Chandler, Okla., where the company maintains its principal field office and yards.

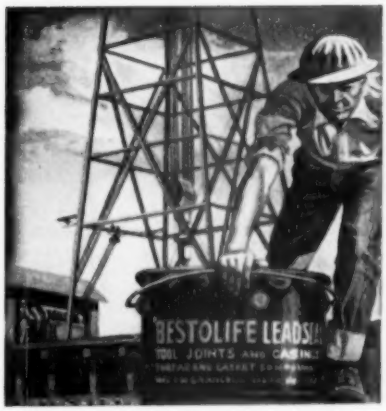
Schafer Drilling Co. currently is operating five rotary rigs, tool pushers for which are: John K. Norman, Chandler; W. H. Middleton, Duncan; R. E. McDonald, Erick; Leroy Townsend, Tecumseh; and Jim Saylor, Davis, all in Oklahoma.

Blackstock has had long experience in oil fields. Before going with Dirickison & Lewis Drilling Co., he was head fisherman for Baash-Ross Tool Co. His father was an active, independent wildcatter and operator in the Southwest several years ago.

Howard Parker has taken on a contract to deepen and rework an old well in Louise field, Wharton County, Texas Gulf Coast, which W. V. Bowles & Co. has taken over from Pure Oil Co. The well, 1 Adams, will be deepened from the field's main pay zone around 6,400 ft. to the lower Frio horizon around 7,300 ft.

York Well Service Co. has contracted for a series of tests to be drilled for Sun Oil Co. in exploration of shallow sands on top the old Belle Isle dome, in St. Mary Parish, Coastal Louisiana. Sun already has made location for 11 such tests, which will be drilled to the top of the salt, ranging in depth from 900 to 2,200 ft.

Newman Brothers Drilling Co., San Antonio, is starting another well for Drilling & Exploration, Inc., of Houston in the new McNair field, 4 miles southwest of Tynan, in San Patricio County, South Texas. The new opera-



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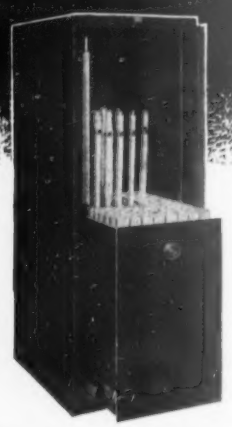

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tion, 2 McNair, is 1,550 ft. northwest of the discovery well, productive from a 4,760-ft. sand.

Two-R Drilling Co. has taken a contract for a projected 13,000-ft. test which Texas Crude Oil Co. will drill at a wildcat location on the operator's State Lease 1893, 4 miles south of White Lake field, in the coastal marshes of Vermilion Parish, Louisiana Gulf Coast.

Grace Drilling Co., Houston, has a contract with Freeport Sulphur Co. of New Orleans, for an 8,000-ft. test to be drilled on Section 28 dome, in St. Martin Parish, Louisiana Gulf Coast. The new operation is listed as 2 St. Martin Land Co., with location in 28-9s-7w.

Southeastern Drilling Co., Dallas, is drilling for The Texas Co. at 54 State Lease 50, a deep test on the southeast flank of East Hackberry dome, Cameron Parish, southwestern Louisiana. Location is ½ mile east of Texaco's 53 State, which recently opened a new deep pay horizon on that side of the dome.

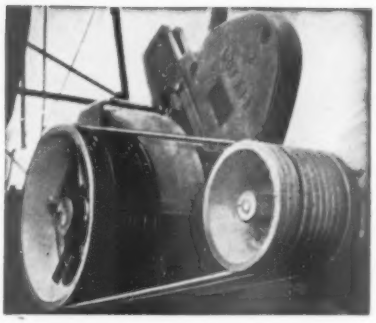
Layton Brown is contractor on a projected 8,000-ft. test F. W. Carr, of Corpus Christi, is drilling at 1 Jones, in the M. J. de la Garza Grant, 2½ miles northwest of Sinton, in San Patricio County, South Texas.

Gene Reid Drilling, Inc., Bakersfield, Calif., has two new contracted wildcat operations under way. One, a 6,500-ft. test, is being drilled for J. D. Manley, III, agent for Manco Corp., Dallas, in the Globe anticline area, near Bakersfield. It is designated as 72-19B, with location in 19-31-23. The other, projected to 5,000 ft., is being put down for Geochemical Surveys, Inc., of Abilene, Tex., in the Alpaugh area as 36-27. Location is in 27-23-23.

ACTIVE ROTARY RIGS*

Area—	Week ended 1-25-54	Change week ended 1-18-54	1-26-53
Gulf Coast	521	— 11	—92
N. & W. Tex.-N.M.	700	— 71	—51
Ark.-N. La.-E. Tex.	154	— 7	+19
Oklahoma	338	— 7	+22
Kans.-S. Neb.	134	— 11	—25
Illinois-Eastern	105	— 13	+24
Rocky Mountains	250	— 11	+45
Pacific Coast	164	— 2	—15
Total U. S.	2,366	—133	—73
Western Canada	140	— 12	—18
Total	2,506	—145	—91

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, and the Pacific Coast, and Illinois-Eastern areas are shown on pages 139 and 140.



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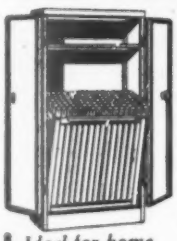

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NATURAL GAS

Texas Asked to Dedicate Hugoton Gas for Pump Fuel

AUSTIN, Tex.—The Texas Railroad Commission has been asked to dedicate a portion of gas produced in Hugoton field for use as irrigation pump fuel.

All three commissioners, in a letter, have asked Texas Atty. Gen. John Ben Shepperd to rule on the commission's authority to dedicate the gas and whether delivery of dedicated gas would would make a pipe-line deliverer a gas utility.

The commissioners asked rulings on whether they can issue orders:

... **Requiring dedication** of a portion of production from a field, or a certain well, for local use, and that such dedicated production not be charged against the allowable.

... **Providing that** a royalty owner has the right to use a portion of his one-eighth of the gas produced for a local use.

... **Providing that** the act of delivering gas from a well on the same land for use as pump fuel does not make the deliverer a gas utility.

... **Regulating the use** of legally produced gas for jetting irrigation water supply wells where such gas may be inefficient or wasteful.

New York State Natural Sets Up 1954 Expenditures

PITTSBURGH, Pa. — An expected expenditure of $8,943,000 during 1954 for improving and expanding facilities has been announced by New York State Natural Gas Corp. here.

However, no major pipe-line activities have been scheduled for 1954 by the company. The company, wholesale supplier of gas to 20 major New York and Pennsylvania distribution companies, spent about $10,946,000 during 1953 for improvements and expansion.

During 1953, the company drilled 24 wells, including storage wells, of which 18 were producers. Based on open flow potentials, additional gas from the wells amounted to 84,256 M.c.f. per day.

Eighty-five additional wells were reworked for storage during 1953 and on October 31, the company had stored 72,520,000 M.c.f. of gas, an increase of 16,657,000 M.c.f. over storage on October 31, 1952. By October 31, 1954, it is estimated storage volume will be about 84,277,000 M.c.f.

New York State Natural spent about $3,140,000 in 1953 for 19 miles of 20-in. line, 22 miles of 14-in. line to replace an old line, 11 miles of 20-in. line to connect with a Tennessee Gas Transmission Co. line, and an 8-mile loop of 20-in. line.

Gas Common Stock Prices Decline During December

NEW YORK.—A slight decline in natural-gas common-stock prices for December 1953, in comparison with prices a year ago, was noted by the American Gas Association.

The price of the common stocks of the composite index of 30 natural-gas companies reported weekly by Moody's Public Utilities, and compiled monthly by the A. G. A., was 3.3 per cent lower on December 31 than a year earlier.

Natural-gas transmission stocks declined 5.2 per cent, while the price of common stocks of distributing companies increased 1.8 per cent.

An increase in yields of 8.5 per cent for similar periods accompanied the decline in the composite index of the 30 natural-gas-company stocks. At the end of December 1953, the composite yield of the 30 stocks was 5.24 per cent as compared to 4.83 per cent a year earlier.

Natural-Gas Sales Down During November 1953

NEW YORK.—The American Gas Association reported that natural-gas sales in November 1953 totaled 4,387,000,000 therms, down 1.7 per cent from the 4,462,000,000 therms sold in November 1952.

During the 12 months ended November 30, 1953, natural-gas sales totaled 52,817,476,000 therms, and 8.7 per cent increase over the 48,579,300,000 therms sold during the 12-month period in 1952.

Natural-Gas Report Out

WASHINGTON.—The 1952 operations and status at the end of the year of 150 natural-gas companies filing annual reports with the Federal Power Commission are included in reports in the 1952 edition of "Statistics of Natural Gas Companies."

The FPC publication contains detailed financial and operating information, income, earned surplus accounts, gas operating revenues, customers, sales, capital stock, long-term debt, gas operating expenses, gas-utility-plant investment, gas account, and data on physical property and number of employes.

Texas' November Gas Down From Year Ago

AUSTIN, Tex.—Total gas production in Texas during November was down 1.07 per cent compared with the same month in 1952, according to the Texas Railroad Commission.

The commission reported 447,639,132 M.c.f. gas produced in the state during November 1953. Of that production, 383,799,612 M.c.f. of gas was available for marketing, a decrease of 1.26 per cent from the same month a year earlier.

Of the total gas production reported, 333,254,659 M.c.f. was produced by 10,032 gas wells and 114,384,473 M.c.f. was casinghead gas produced from 90,732 oil wells.

Natural Gasoline

November Natural-Gasoline Production Shows Increase

WASHINGTON.— The Bureau of Mines reported a daily average output of 683,000 bbl. of natural gasoline and allied products during November 1953, an increase of 11,000 bbl. per day over October output.

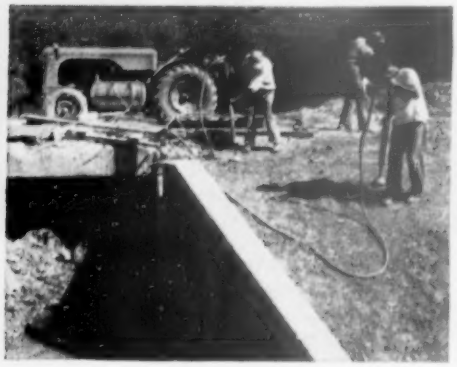
The November 1953 production also represented an increase of 38,000 bbl. per day over the daily average of 645,000 bbl. during November 1952. The 11-month average for 1953 was 659,000 bbl. per day, a 60,000-bbl. per day increase over the 11-month average for 1952.

The daily average natural-gasoline output for November compared with an average of 672,000 bbl. per day in October, 674,000 bbl. per day in September, and 665,000 bbl. per day in August of this year.

Texas November production showed a decrease averaging 7,000 bbl. per day during November, dropping from 370,000 bbl. per day in October to 363,000 bbl. per day in November.

Louisiana showed the largest increase in November natural-gasoline output, adding 5,200 bbl. per day over October output. New Mexico increased an average of 3,600 bbl. per day and Kansas had an average daily increase of 3,000 bbl.

Tamping — Here's a Le Roi-CLEVELAND back-fill tamper air-powered by Tractair, that gives you faster, easier tamping, better compaction, lower costs. This example shows how Tractair teams up with Le Roi-CLEVELAND Air Tools to save time, work, money.



Cutting asphalt pavement — with a Tractair-powered Le Roi-CLEVELAND paving breaker. Note, Tractair in background is equipped with a sweeping attachment. This is just another of many ways that Tractair can save you money.

Drilling trench — Easy holding Le Roi-CLEVELAND sinkers provide the fastest way of drilling rock. The air-power source is a Tractair, equipped with a front-end loader. Tractair is extremely mobile. It has a low center of gravity. It takes money-saving air power anywhere.

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It holds down your investment in special equipment

Because Tractair is a combination 35-hp wheel tractor and 105-cfm air compressor, it is extremely versatile.

It lets you take air power wherever you want it — air power for drilling rock, tamping fill, breaking concrete, driving spikes and form pins, or pumping water.

When it is equipped with attachments, you get added usefulness. You can load, back-fill, dig, sweep or hoist.

Although Tractair was pioneered and developed by Le Roi Company to do 10 basic jobs, its money-saving usefulness on costly, nuisance-type work is limited only by the user's imagination.

If you want to cut costs, get Tractair. Call your Le Roi dealer for a demonstration, or write us for further information.

LE ROI GIVES YOU MORE FOR YOUR MONEY

More Utility!
More Profits!

Loading — Tractair takes air power practically everywhere, yet it can be used for a wide variety of other jobs. Its front-end loading attachment, for example, has 8 accessories that interchange easily, so that Tractair can load, lift, back-fill, plow, etc.

Tractair with Mobildrill — Mobildrill is a lightweight wagon-drill attachment for Tractair. It gives you unusual mobility — one man can drill holes at any angle and any elevation up to 12 feet. Swinging boom permits drilling 4-6 holes of a pattern from one spot.

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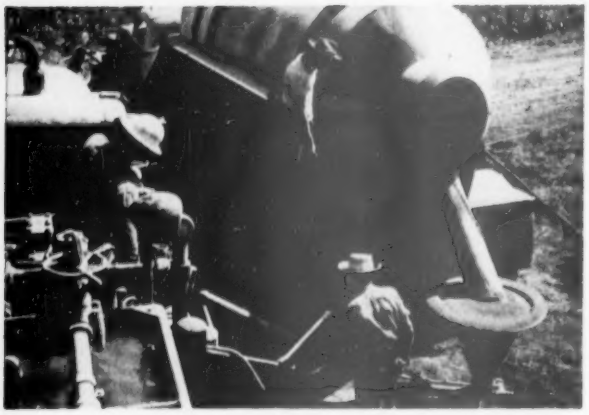

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EXPLORATION

Renaissance in East Texas?

by Frank J. Gardner

FROM its very discovery, the great East Texas oil field has captured the imagination and fired the spirit of every exploration man in the oil industry. Its magnitude and productivity were enough in themselves to stir the hearts and minds of laymen everywhere, but to the geologist its very existence presented a challenge and a realization that structural theory is only a part of the story of oil accumulation.

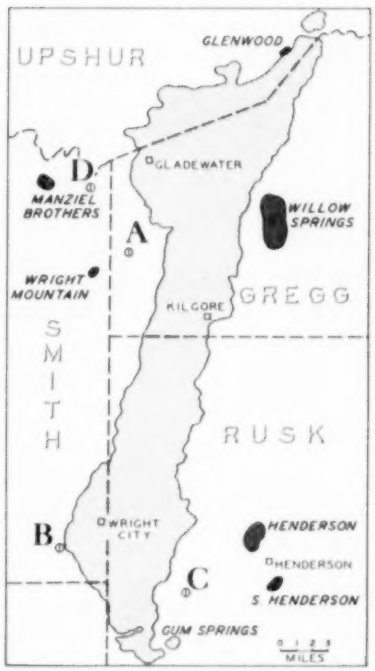
Current developments on the flanks of the big field emphasize the importance of intensified stratigraphic study throughout the East Texas basin. The potentialities of the Trinity and pre-Trinity groups are at pesent an unknown factor, and the full realization of their significance as oil reservoirs must no doubt await a long program of probing with the drill, the core barrel, and the microscope.

Exploration now under way around East Texas field falls into two major categories: (1) reexamination of the strata of the Woodbine proper, with an eye to recompletion of older wells in new reservoirs, and (2) development of production from the deeper Trinity rocks (Rodessa, Pettit, and Travis Peak). Until recently, the deepest horizon tested within the field limits was the Paluxy, found at 5,353 ft. in Humble Oil & Refining Co. 37 Holland.

Total of 200 Rework Jobs

Deepening and recompletion of old Woodbine producers in deeper sands of Woodbine age have been going on in the southern end of the field since the latter part of 1949; the East Texas Oil Association estimates that there have been some 200 of these rework jobs to date. Wells are drilled through the water (which is squeezed off with plastic cement) and past a shale break of 65 to 150 ft., where pay sands averaging 20 to 30 ft. in thickness are found.

Whether these sands are uniform under the entire field is questionable; general opinion is that they will be encountered only in the area south of Kilgore. In any case, these deeper sand stringers could materially increase the ultimate recovery from the Woodbine reservoir, and a great deal of subsurface study is now being devoted to their detection. The recent discovery



Sketch map of East Texas field area, showing producing fields and current deep tests (letters identify wells discussed in text).

and expansion of Gum Springs field at the southern tip of East Texas field is an interesting illustration of this current trend in discovery methods.

In this southern part of the field, the Woodbine sands are not continuous, some wells having as many as 10 shale breaks within the reservoir. Shale and sand bodies cannot readily be correlated from one well to the next, and only 30 to 60 per cent of the total Woodbine section is net effective pay. Consequently, a detailed log study and concentrated testing program has in many instances opened to production a number of lenses and stringers previously cased off or overlooked.

More important from the standpoint of new reserves is the active search now in progress on every flank of the old field for production from the Trinity rocks. Already, at least five areas are flowing oil and gas from these deep reservoirs at depths of 7,000 to 8,000 ft. (areas crosshatched on map).

Of these, three were 1953 discoveries. Four important tests are going down on the flanks of the field proper: Rexall Drilling Co. 1 McCubbin (A on map) will drill to 8,500 ft. in the hunt for Pettit oil; Sun Oil Co. 39-B Pace (B on map) is testing Pettit perforations at 7,900 ft.; and Great Expectations Oil Corp. is nearing contract depth in its 1 Redwine (C on map).

The fourth well, just announced, will test the Travis Peak about midway between Manziel Brothers field and the westernmost edge of East Texas field; this will be the 1 McNutt (D on map), drilled by Haynes B. Ownby Drilling Co. et al., and contracted to penetrate at least 200 ft. into the Travis Peak.

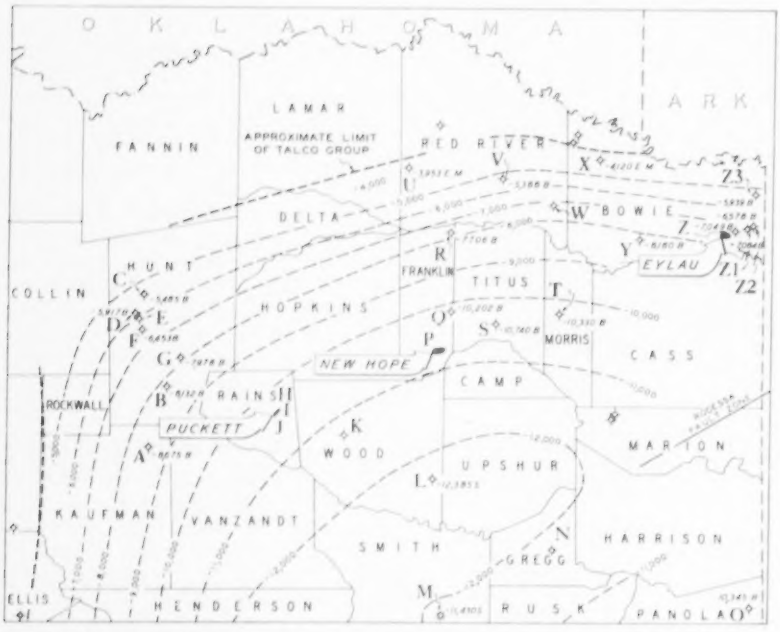
What of the Future?

A third phase of East Texas exploration, more nebulous than the Trinity campaign, lies largely in the future. This is the problem of delineation of occurrence and continuity of the Jurassic-Smackover rocks in the East Texas basin. A survey of our present knowledge of the problem may be found elsewhere in this issue (see page 124). Considerable encouragement has come from four discoveries of Jurassic production, one in Rains County, two in Bowie County, and the other in Franklin County. Whether they portend a future Jurassic exploration campaign will largely depend upon accessibility, reservoir lithology, and quality of product, but commercialization of these reservoirs could well provide the stimulus for aggressive exploration in the coming years. Two new 13,000-ft. Jurassic wildcats are to be drilled in 1954; one lies in Cayuga field, Anderson County, and the other in Yantis field, Wood County.

Here, then, is a challenge to the exploration geologist; structures are plentiful throughout Northeast Texas, but stratigraphy will no doubt be the ultimate determining factor in finding the great amounts of oil yet undiscovered in the depths of the basin. To solve the riddle of its 16 nonproductive piercement salt domes, to find new Trinity pools, and to unravel the problem of Jurassic-Smackover distribution may require years of careful and painstaking study, but the rewards in new reserves should certainly justify the effort in this engaging area of exploration.

Jurassic Strike Steps Up Deep Search in East Texas Geosyncline

by Joseph A. Kornfeld



SUBSURFACE STRUCTURE contour map of Jurassic pre-Cotton Valley beds of northern portion of East Texas geosyncline mapped on Eagle Mills, Buckner, and Smackover formations. (After Swain, Bull. A.A.P.G.).

RECENT completion of a gas-condensate discovery from Jurassic limestones in New Hope field of Franklin County, Texas, coupled with starting of two new deep tests to Jurassic rocks in Cayuga and Yantis fields, intensifies exploration interest in deeper possibilities in the East Texas geosyncline.

New Hope deep strike . . . In southeastern Franklin County, New Hope field received its deepest pay discovery last week with completion of Tide Water Associated Oil Co. 1 Ramey Unit (P), located 9½ miles southeast of Mount Vernon. Initial potential was 608 bbl. of condensate plus 3,829 M.M.c.f. of gas per day through 18/64-in. choke. Initial produced gas-condensate ratio was 6,290 cu. ft. per bbl. of condensate. Produced gravity is 61.5° A.P.I. Flowing tubing pressure was 2,873 psig.

Gas-condensate production is from open hole in Jurassic limestones from 12,096-12,331 ft., plug-back depth. Other producing horizons in New Hope field are from Lower Cretaceous reservoirs including the Rodessa, Pittsburg, Bacon limestone, and Travis Peak formations.

Cayuga deep test . . . First Smackover test for the Cayuga field of northwestern Anderson County, Texas, was rigging up last week. Harry Bass Drilling Co., Dallas, has moved in heavy-duty rig to drill a 13,000-ft. contract for Tide Water Associated Oil Co. at its 6

TABULATION OF SMACKOVER FORMATION WELLS—EAST TEXAS GEOSYNCLINE

Operator, lease, county—Field—Map No.—	Year comp.	Surface elevation (d.f.)	Cotton Valley (ft. subsea)	Buckner (ft. subsea)	Smack-over (ft. subsea)	Louann salt (ft. subsea)	Paleozoics (ft. subsea)	Total depth (ft. subsea)	Present status
Sun Oil Co. 1 Rutledge, Kaufman—Wildcat—(A)	1943	584	7,056	8,675	9,458	(*)		9,473	Dry
Ohio Oil Co. 1 Popper, Hunt—Wildcat—(B)	1945	479	6,597	8,132	8,702			8,911	Dry
Humble Oil 1 Anderson, Hunt—Wildcat—(C)	1944	599	4,907	5,485	absent		5,605	5,674	Dry
American Liberty 1 McNutt, Hunt—Wildcat—(D)		573	5,182	5,917				6,322	Dry
Humble Oil 1 Norman, Hunt—Wildcat—(E)	1944	559	5,457	6,157				6,598	Dry
Humble Oil 1 Rutherford, Hunt—Wildcat—(F)	1943	540	5,610	6,453	6,632		6,926	6,942	Dry
Humble Oil 1 Graham, Hunt—Wildcat—(G)	1943	530	6,736	7,978	8,482	8,982	(*)	8,992	Dry
R. J. Caraway 1 Puckett, Rains—Puckett—(H)	1951	470	9,003	10,775	11,350			12,132	Gas
R. J. Caraway 1 Jenkins-Shipp, Rains—Puckett—(I)	1952	492		11,078				11,543	Dry
Shell Oil Co. 1 Prince, Rains—Puckett—(J)	1952								Dry
Shell Oil Co. 11 Goldsmith, Wood—Quitman—(K)			9,332						
Humble Oil 1 McKnight, Wood—Hawkins—(L)		360	10,890		12,385	14,050		14,269	Dry
Sinclair Oil 1 Schofner, Smith—Chapel Hill—(M)	1946	468	9,305	9,422	11,430			13,107	P.B.
Humble 1 Robertson, Gregg—Wildcat—(N)		272	9,315					9,978	Gas†
Texas Co. 1 Adams, Panola—Bethany—(O)			7,498		10,345				
Tide Water 1 Ramey, Franklin—New Hope—(P)	1954	400	8,954	11,096	11,400			12,285	Gas
Humble Oil 1 Hague, Franklin—Wildcat—(Q)	1944	423	8,387	10,202	10,896			11,167	Dry
White 1 Jackson, Franklin—Wildcat—(R)	1942	356	6,300	7,706	8,224	8,693		8,728	Dry
Humble 1 Searcy, Titus—Wildcat—(S)	1945	398	8,732	10,740	11,392			11,612	Dry
Humble 1 Wright, Morris—Wildcat—(T)	1944	338	8,603	10,330				11,478	Dry
Magnolia 1 Henry, Red River—Wildcat—(U)	1941	472	3,713			3,935	4,238	4,316	Dry
Texas Co. 1 Solomon, Red River—Wildcat—(V)	1944		4,550	5,388	5,563		5,643	5,804	Dry
Tex Harvey 1 York, Red River—Wildcat—(W)				7,274					Dry
Hughes 1 Howard, Bowie—Wildcat—(X)						4,120			Dry
Bowlen 1 Simms, Bowie—Wildcat—(Y)	1943			8,180	8,514			8,641	Dry
Barnsdall 1 Greenwood, Bowie—Eylau—(Z)	1947	305	5,877	7,044	7,340			7,783	Dry
Barnsdall 1 Heilbron, Bowie—Wildcat—(Z1)	1944	285		7,184				7,551	Dry
Barnsdall 1 N. Pickering, Bowie—Wildcat—(Z2)	1947	298	5,977	6,578				7,546	Dry
Hawkins 1 Cork, Bowie—Wildcat—(Z3)				5,939					Dry
Barnsdall 1 Ivy Pickering Bowie—Flower Acres—(Z4)		299	5,601	6,577	6,729			7,202	Gas

*This formation not reached. †Plugged back to 7,910 ft. and completed as gas-condensate well from 7,244-85 ft.

H. R. Rampy in the James Wilson Survey, Abstract 793, on the southeast flank of the field.

Deepest test drilled at Cayuga to date was bottomed at 9,077 ft. at a 1,095-ft. penetration of Travis Peak formation of Cretaceous Comanchean age. Cayuga produces from Cretaceous reservoirs in the Woodbine and Glen Rose series on a north-south trending anticlinal fold. Step faults limit Woodbine production on the east side of the fold.

Deep Yantis test... Last week, Humble Oil & Refining Co. announced staking of a 13,000-ft. test to the Smackover (Jurassic) limestone in the heart of Yantis pool of Wood County. It will be its 2 Yantis Gas Unit, located on a 689.12-acre tract, 4 miles due east of the townsite of Yantis and midway between the new Jurassic discovery in New Hope pool and the one-well Puckett (Jurassic) gas-distillate pool near Emory in Rains County (H).

Future Exploration

Jurassic strike at New Hope field points up exploration value of testing prominent anticlines now producing in the East Texas geosyncline and situated downdip from the well-known series of en echelon Balcones and associated fault zones which rim the west and north flanks of the basin.

This strike making the first significant discovery of sweet-gas distillate to be found in Jurassic formations in the basin is to be contrasted with the disappointing discovery in 1951 surrounding the sour-gas strike in the Puckett field (H) near Emory in Rains County.

Eylau field in Bowie County is the only commercial oil production devel-

FORMATION SEQUENCE—PRE-GULFIAN CRETACEOUS ROCKS

Western Gulf Province — East Texas Geosyncline

Tide Water Associated Oil Co. 1 Ramey Unit, John Maximillian Survey, New Hope field, Franklin County, Texas.
Surface elevation: 400 ft.

	Feet
CRETACEOUS:	
Comanchean	4,613
Base Ferry Lake anhydrite	7,290
Travis Peak formation	7,944
UPPER JURASSIC:	
Cotton Valley formation	9,354
Cotton Valley black shale	10,472
Haynesville (Cotton Valley) lime	10,974
Buckner (?)	11,496
Smackover formation (?)	11,800
Norphlet red beds	12,657
unconformity	
PERMIAN (?):	
Salt beds	

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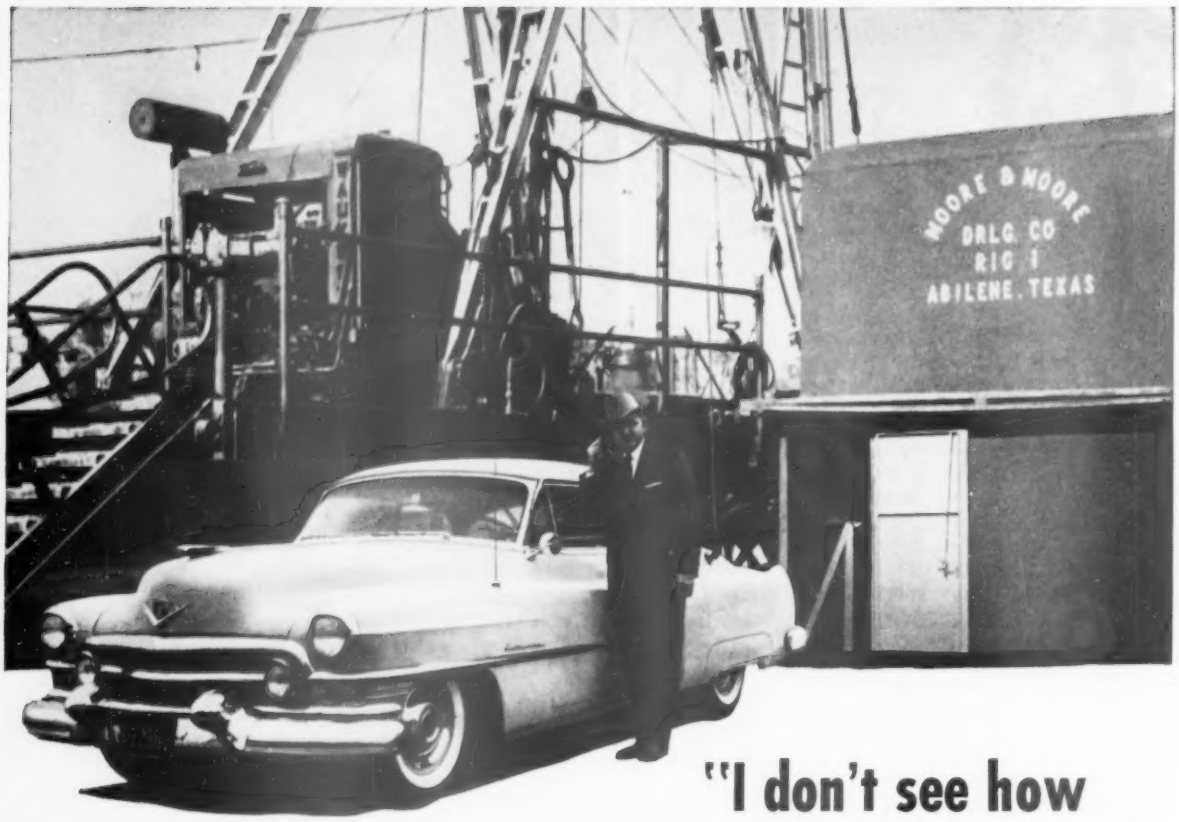

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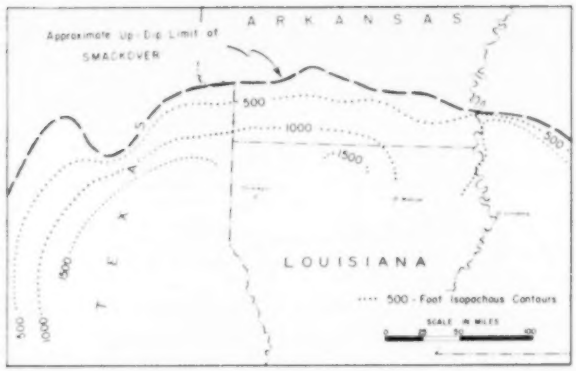
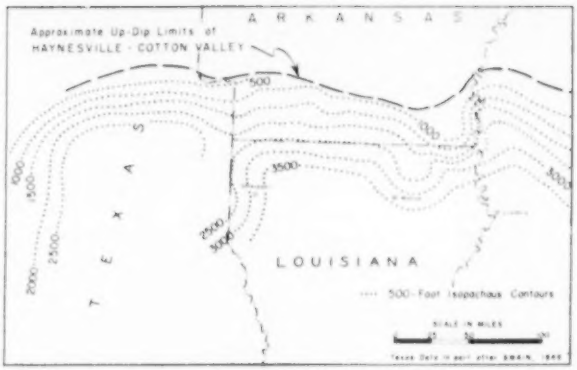


SMACKOVER FORMATION (Haynesville, in part) contour map of East Texas geosyncline and adjacent features. Contour interval 500 ft. (After Murray, Bull. Geol. Soc. Am.).



COTTON VALLEY GROUP (Haynesville, in part) contour map of East Texas geosyncline and adjacent features. Contour interval 500 ft. (After Murray, Bull. Geol. Soc. Am.).

oped from the Smackover rocks in the East Texas geosyncline; a total of 300,000 bbl. of oil has been recovered from the discovery well which has been rimmed by four dry holes.

During 1946, sour gas with low B.t.u. value and high nitrogen content was discovered on the east side of Bowie County near the town of Texarkana by Barnsdall Oil Co., Sohio Petroleum Co., and Phillips Petroleum Co. at 1 Ivy Pickering, (Z4), in the R. E. Sevey Survey. Initially it flowed 59 bbl. of 68° A.P.I. gravity distillate with a gas-condensate ratio of 63,000 cu. ft. per bbl. on a 20/64-in. choke after acid treatment from open hole in Smackover dolomite from 7,030-88 ft. However, the poor quality of the gas precluded a commercial market for the find.

Past Exploration

Single deep tests drilled on the crest of prominent structures in the East Texas geosyncline do not necessarily condemn production possibilities from these structures. Examples of pronounced features which have received one deep test each include Van, Hawkins (L), Quitman (K), Kelsey, and Chapel Hill (M), which lie in the heart of the geosyncline.

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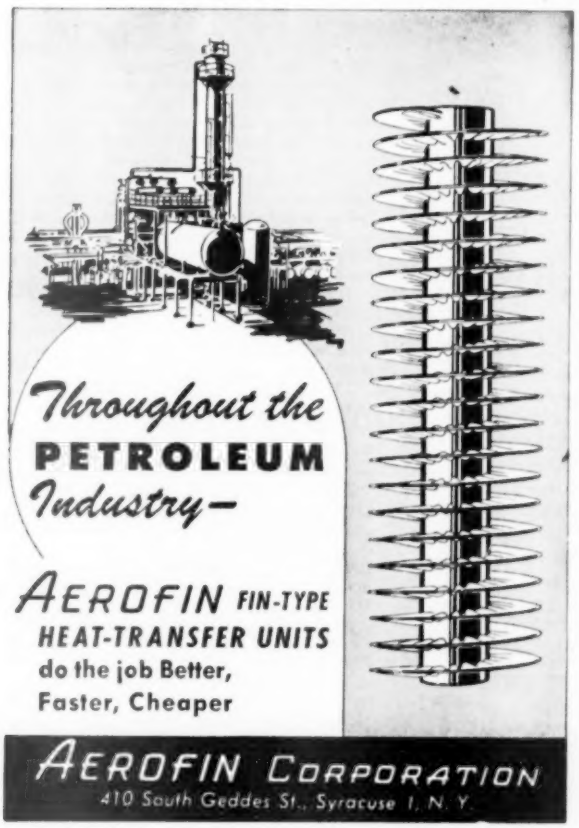

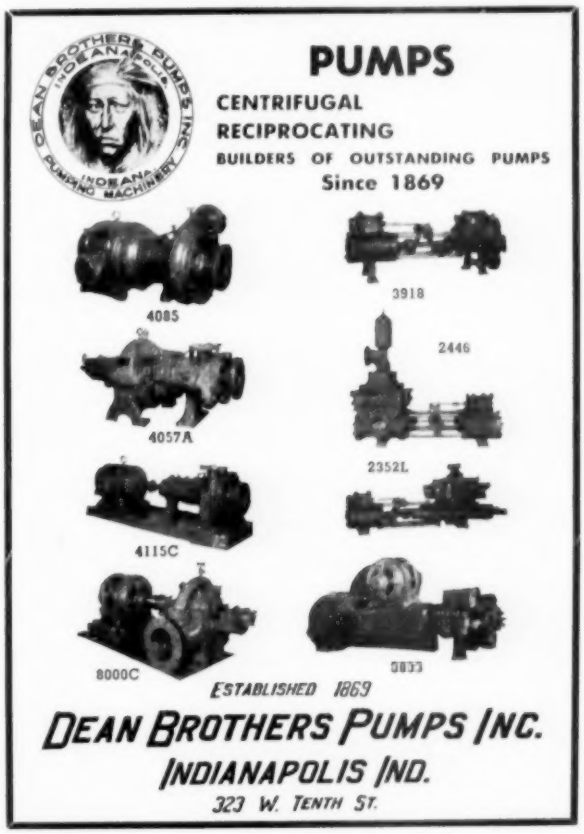

OKLAHOMA

Good Areal Development At Southeast Sunflower

Lincoln County's Southeast Sunflower pool is expanding successfully to the north and northwest of the discovery well.

E. L. Oliver has completed a flank test at 2 Whitney, SE SE SE 20-14n-2e, off the northwest edge of field production. The well is flowing on 6/64-in. choke from the Checkerboard sand through perforations at 3,932-43 ft. The well flowed 30 bbl. of new oil per hour after fracture treatment. Another well, the 3 Paschall, NE NE NW 28, is drilling below 3,751 ft. About ½ mile of other production Oliver has finaled 3 Ebert, NW NE SW 21. This well flowed 75 bbl. of oil daily through ⅛-in. choke through perforations at 3,872-84 ft.

Yellowstone Extended To the Southeast

Peppers Refining Co. has proven gas-distillate production in Woods County's new Yellowstone pool ½ mile to the southeast at 1 Mayes in NE NE NE 20-29n-17w.

Top of the Arbuckle was 5,905 ft. Casing was perforated in the upper part of the Arbuckle and the well flowed an estimated 17,000 M.c.f. of gas per day. The well produced 17 bbl. of 72.6°-gravity distillate per million after the gas flow was pinched to 3,000 M.c.f. per day.

Champlin Refining Co. opened the pool at 1 Diamond in NE NE SW 17. The company has two more wells ready for completion, the 1 Dyer in NE SE NW 17, and the 1 O'Donnell in NE SE SW 17. The 1 Dyer flowed 1,500 M.c.f. of gas per day with 1,276 bbl. of fluid, 70 per cent oil, from perforations at 6,182-97 ft. in the Arbuckle. Wet gas flowed at the estimated rate of 10,000 M.c.f. per day from perforations at 6,153-73 ft. in the Arbuckle, also. The 1 O'Donnell flowed 14 bbl. of distillate and 2,000 M.c.f. of gas per day from the Arbuckle through perforations at 6,018-86, 6,092-6,116 and 6,112-28 ft.

Atoka Sand Shows at Atoka County Wildcat

Gulf Oil Corp. is drilling ahead at 3,331 ft. in lime after shows were encountered on a drill-stem test of the Atoka sand at 2,974-3,029 ft. at 1 Butler, C SW NE 21-3s-10e. Recovery on the test was 65 ft. of oil and gas-cut mud and ½ pint of free oil.

Third Well at El Reno Pool Assured

El Reno pool in Canadian County has its third well and a 1-mile extension assured at Sinclair Oil & Gas Co. 1 Community-Metta Wise, NW SE NW 14-12n-7w. The well flowed gas in 45 minutes during a drill-stem test at 10,388-423 ft. in the second Wilcox sand. Gas volume was 5,700 M.c.f. per day. The new well is located ½ mile southeast of the field discovery well.

High Flow Rate at Lincoln Confirmation Established

A high flow rate has been established at East Basin Oil Co. 1 Springer in NW SW SW 10-15n-4e, northeast offset to new Southeast Hardscrabble pool in Lincoln County.

The second well in the pool found the top of the Red Fork at 4,056 ft. After the plug was drilled swabbing recovered ½ to 1 bbl. of oil. The well flowed 100 bbl. of load oil during the first hour, 87 bbl. the second hour and 110 bbl. the third hour. The well then flowed 100 bbl. of new oil hourly for 2 hours. The well flowed 200 bbl. of new oil in 20 hours on 10/64-in. opening, pinched on a casing choke, and is now shut-in for tank storage.

The discovery well of the pool was Deep Rock Oil Corp. 1 Tom Rowan "A," SE SE SE 9. It flowed 45 bbl. of oil per day on final test on ¾-in. tubing choke on completion last August.

Deep Wildcat Due In Pittsburg County

Signal Oil and Gas Co. and Hancock Oil Co. announced the location of a stratigraphic test in Pittsburg County, Oklahoma, in Section 15-2n-14e. This test will be drilled under the name of the Southwest Exploration Co. in which Signal owns a majority interest and Hancock all of the remaining interest.

The well is projected to a depth below 10,000 ft. It is located in the area in southeastern Oklahoma where the overlying Ouachita facies are thought to have been thrust over underlying Arbuckle rocks. In this region of overthrusting, believed to cover several thousand square miles, no wells have definitely drilled through the overthrust to reach and explore the underlying Arbuckle facies.

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present below the overthrust, this would include reservoir rocks that have proved very productive in the Seminole platform in Oklahoma. Among the better of such reservoirs are the Wilcox (bromide), Tulip Creek, McLish and Oil Creek sands of the Simpson Series, as well as the Hunton and Viola limes. Of course, there also exists the possibility of production in the overlying facies in which there are two small producing pools in the area at the present time. For many years, numerous oil seeps have been observed in this region, and many geologists thought that a new oil province might lie beneath the overthrust. It is hoped that this first deep stratigraphic test might shed some light on this theory.

High Flow Rate Reported At Kellyville Discovery

Kirschner Bros. et al 1-A Bunting, SW NW NW 3-16n-10e, in the South Kellyville district, Creek County, is shut-in for more tankage and pipe-line connection.

The 2-mile discovery flowed 200 bbl. of oil in 5¼ hours after fracture treatment on one test in the Red Fork sand perforated at 2,076-2,100 ft.

Prolific Springer Pay Proved at Grady Wildcat

British-American Oil Producing Co. has proven prolific Springer sand pay at a 1-mile outpost to Southeast Bradley pool in southeastern Grady County. The 1 Burkes, C SW NE 12-4n-5w, flowed 223 bbl. of oil in 21 hours on variable chokes from Springer sand perforations at 9,270-9,300 and 9,312-32 ft. The well then flowed 155 bbl. of oil in 24 hours on 16/64-in. choke, tubing pressure 375 psi.

New Pay in Grady

Springer sand production has been established in Southeast Bradley pool in southeastern Grady County, southwestern Oklahoma by Magnolia Petroleum Co. at 1 Howell-Gragg, C NW SE 14-4n-5w.

The well flowed 325 bbl. of new oil in 24 hours through 24/64-in. choke on completion test through 2½-in. tubing. Production is from lower Springer sand perforations at 9,860-92 and 9,899-9,905 ft. Production in the field is from the Hart sand between 8,800 and 9,000 ft.

KENTUCKY

WESTERN KENTUCKY

In Hopkins County, 3 miles north of Happy Hollow, J. W. McClurg-Kendall & Davis-R. E. Stouder have set casing at 1 Corum, 9-L-26, after a drill-stem test at 2,633-42 ft. in the O'Hara lime flowed clean oil in 18 minutes, making it the best well in this new O'Hara pool to date. The pool has 5 producers and 2 dry holes.

EASTERN KENTUCKY

In Wolfe County and about 2½ miles south of Campton, J. J. Hatcher et al have completed 1 Dora Elkins as a Corniferous lime producer. Reported gage was 5 bbl. of oil daily from that formation topped at 1,299 ft. and drilled to a total depth of 1,306 ft. Well was located in the southern portion of greater Campton pool.

In Lawrence County Johnson et al are drilling at 1,565 ft. at 1 R. R. Kize. This is a wildcat test of the Berea (Mississippian) sandstone expected at approximately 1,700 ft. and is in an area where previous drilling has shown possibilities of oil and gas production in the area.

TEXAS

NORTH TEXAS

Cambrian Discovery Is Completed

Kilroy Oil Co. of Texas 1 Roberts, 3 miles south of Nolan in Nolan County, has been completed for 1,292 bbl. of 52° oil daily, to give the county its second discovery in Cambrian pay.

Potential on the new well was based on a 6-hour test of 323 bbl. of oil through ½-in. choke, from perforations at 6,102-17 ft. Top of the Cambrian sand was placed at 6,069 ft., on elevation of 2,240 ft. This well also recovered 1,000 ft. of oil on a drill-stem test in Goens limestone between 5,564-5,604 ft., according to reports, cut a 50-ft. Ellenburger section just above the Cambrian.

Location of Kilroy Oil Co.'s discovery is about 18 miles southwest of Whiteflat field, which has at least three wells with thick Cambrian pay sections and high completion potentials. Bronte field, which has Cambrian production, lies 26 miles farther south. Oil and gas were also logged in Republic Natural Gas Co. 1 Hair, Pennsylvanian discovery 30 miles south of Bronte, in Tom Green County.

Operators are talking of a possible 50-mile Cambrian trend from Bronte field, and the oil and gas shows in Wilberns dolomite at 5,965-6,000 ft. in Republic 1 Hair may add more incentive to the active lease play now under way due to the latest Cambrian strike.

Ellenburger discovery . . . Texas Pacific Coal & Oil Co. 1 May Sears, 4 miles west of Whiteflat field, in 33-20-T&P Survey, finished as an Ellenburger discovery from perforations at 5,900-26 ft. Potential gage through 16/64-in. choke was 192.5 bbl. in 24 hours. Whiteflat field also produces from the Ellenburger.

WEST TEXAS

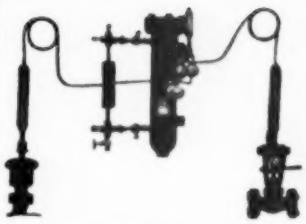
Wemac-Ellenburger Strike Completed

Continental Oil Co. 5 McCollum & Weibusch, Andrews County deep test one location south of the Wemac-Wolfcamp discovery, has been completed for a calculated daily potential of 1,320 bbl. of oil. On a 12-hour test through 20/64-in. choke the well made 660 bbl. of oil with no water. Top of the Ellenburger was 13,246 ft. and perforations were between 13,306-13,343 ft.

Prospects of a confirmation well for the Butler-Devonian discovery in northeast Andrews County were a little brighter last week. Plymouth Oil Co. 1 Butler, north offset, flowed 45 bbl. of oil by heads in 12 hours. The test was through 1-in. choke, from perforations at 12,595-12,603 ft. Top of the Devonian was 12,543 ft. on elevation of 3,022 ft. and total depth was 12,616 ft.

L. M. Glasco et al 1 Newton, east extension try, was waiting on orders at 12,728 ft. after finding salt water with no shows in the Devonian.

Sixth pay at Pegasus . . . Flush production from the Glorietta (middle Permian) at Sinclair Oil & Gas Co. 17 June Tippett has added another pay zone to Pegasus field. On potential test the well flowed 883 bbl. of 30°



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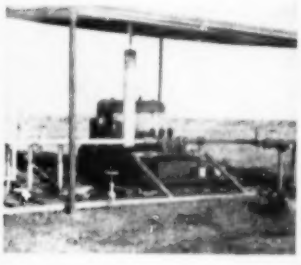

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oil a day through ½-in. choke from perforations at 5,584-5,610 ft. Total depth was 5,629 ft. Top of pay was placed at 5,176 ft. on elevation of 2,854 ft. Location in 17-40-T4S-T&P is in the northeast sector, in Midland County.

Howard discovery completed . . . Trans-Tex Drilling Co. and N. P. Powell 1 Reed Ranch, northeast of Big Spring, flowed 504 bbl. of 47° oil a day on potential test. The gage was through 18/64-in. choke from pay perforations at 7,713-21 ft. Top of the Pennsylvanian, by samples was 7,712 ft., minus 5,284 ft. and completion was without acid.

Ector test flows Ellenburger oil . . . Cities Service Oil Co. 1-J Cummins, multipay prospect in the North Goldsmith area, flowed oil on drill-stem test in the Ellenburger and will complete from that formation. Last reported test, in the Ellenburger, from 8,889-8,928 ft. had flowing oil in 1 hour and 25 minutes. After cleaning into pits it tanked 62.41 bbl. of oil in 3 hours through 1-in. choke. Top of the Ellenburger by samples was 8,885 ft., minus 5,620 ft. This well also flowed oil in the Fusselman and recovered free oil on test in the McKee sand of the Simpson. Nearby production at North Goldsmith is from the San Andres around 4,450 ft. and the Silurian at 8,200 ft.

SOUTHWEST TEXAS

Shallow Gas Field Opened

A new, shallow dry-gas field has been opened in eastern McMullen County, near the Live Oak County line. Discovery well, 4 Hays-Ezell, drilled by J. R. Butler, Inc., flowed at the rate of 39,000,000 cu. ft. daily on completion gage. Sand interval is at 1,193-97 ft. Three previous tests on the acreage, farmed out from Holly Development Co., failed. All are in the Thomas Adams Survey. The operator's fifth test is in the pay as an indicated gas well but has not been gaged.

Lacy Field Adds New Pay

Another Frio gas-condensate producing zone has been established for Lacy field, in Hidalgo County, with the completion by Hydrocarbon Production Co. of its 14 Crain & Griffith in the North Capisallo Subdivision. The new pay is at 7,503-11 ft., open through casing perforations. Initial production through 16/64-in. choke was gaged at the rate of 10,000,000 cu. ft. of gas and 150 bbl. of condensate per day. Flowing pressure of 2,322 psi. was recorded.

TEXAS GULF COAST

Lick Branch Field Gets 1½-Mile East Extension

Production of Lick Branch field, in Liberty County, has been extended 1½ miles to the east with completion by Floyd L. Karsten of his 1 Weeren, located in the F. Gibenrath Survey.

The extension well, producing from a casing-perforated interval at 8,678-84 ft., in Wilcox sand, flowed at the rate of 8,600,000 cu. ft. of gas daily (open flow), spraying 62.3°-gravity condensate. Shut-in pressure gaged 2,898 psi.

Hole had been drilled to 9,601 ft.

New Sugar Valley Well

Humble Oil & Refining Co. has completed another well for Sugar Valley field, in Matagorda County. The well, 4-B Taylor et al, located in the Freeman George Survey, on the south side of the field, flowed at the rate of 4,000,000 cu. ft. of gas and 61 bbl. of condensate daily through chokes, gaging 2,150-psi. pressure on the tubing. Production is from sand interval at 12,000-122 ft. The well is shut in.

CANADA

Light Gravity Oil Found In the Kessler Area

A five company team has discovered light-gravity oil in the Viking sand at a wildcat in the Kessler area of central east Alberta, 70 miles east of Stettler, 42 miles west of the Saskatchewan border and 37 miles south of Wainwright. A flow of 34.7°-gravity oil reached the surface during discovery drill-stem test.

The discovery, Mill City-Sweetgrass et al 1 East Kessler, LSD 7, 30-38-7w4, is 3½ miles east-southeast of the Mill City-Sweetgrass-Kroy group's 1 Kessler Viking gas discovery well and about 20 miles northeast of the Hamilton Lake Viking oil field that was discovered in November 1952.

Discovery was assured during 1-hour drill-stem test of the Viking interval 2,370 to 2,392 ft. Natural-gas flow in 3 minutes at estimated rate 400,000 cu. ft. daily, fluid flowed in 16 minutes, and oil reached the surface in 21 minutes, flowing by heads. The packer was left in the hole overnight, and when it was pulled it was found to contain 210 ft. of oil-cut mud and 460 ft. of clean 34.7°-gravity crude oil. Two other drill-stem tests have been run, from 2,392-97 ft., and 2,397-2,421 ft., but only drilling mud was recovered.

Kneehill . . . Natural gas has been discovered in the basal Belly River sand at an exploratory venture being drilled by the Seaboard-Honolulu-Merrill-Cancoll group on farmout lands from Banff Oil, Ltd., in the Kneehill area of southern Alberta, 19 miles southeast of Red Deer. This new strike is on lands that Banff originally acquired under agreement from the Calgary & Edmonton Corp., Ltd.

The new gasser is Seaboard-Banff 1-9 Kneehill, LSD 1, 9-35-26w4, 18 miles west-southwest of the Husky-Phillips 1 Pine Lake marginal Devonian oil producer and about 5½ miles southwest of Amurex-Calvan 1-3 Three Hills Creek Mississippian capped potential gas well. Crew entered the basal Belly River at 3,455 ft., or 259 ft. subsea, and ran first test in that section from 3,445-80 ft. for 45 minutes. There was a good initial puff, increasing to a strong blow. Gas flowed in 12 minutes, at estimated rate 500,000 cu. ft. daily. Recovery was 151 ft. of gassy drilling mud.

Second test, from 3,478-95 ft. for 45 minutes, flowed gas in 4 minutes, at estimated rate of 1,500,000 cu. ft. daily. Recovery was 40 ft. of slightly gassy mud. Drilling is being continued.

Manitoba . . . Crawford E. Smith Drilling Co. has found an encouraging showing of light gravity oil in the Mississippian at its initial exploratory driller in southwest Manitoba. String of production casing has been set, preliminary to running evaluation tests.

The well, John Lucien 1 Canart, LSD 6, 16-11-29w1, is 11 miles northwest of Daly oil field at Virden, 20 miles west-northwest of Roselea oil producers and 63 miles west of Brandon.

Initial Mississippian drill-stem test was run from 2,431-41 ft. for ½ hour and recovery was 60 ft. of slightly oil-cut mud. Test from 2,447-70 ft. was a misrun, and third test—from 2,488-2,570 ft. gave up 2,050 ft. of muddy gas-cut salty sulfurous water. A later straddle-packer test from 2,446-2,545 ft. for 97 minutes, yielded 40 ft. of highly oil-cut mud. Hole is bottomed at 2,570 ft., and string of 6⅝-in. casing was set at 2,540 ft.

ILLINOIS

A good new pool is being developed by Don Baines and Associates 5 miles southeast of Clay City in Clay and Richland counties. Two wells are on the pump and the third is setting casing, all in the Rosiclare lime. The 1 Diel, SE NW SE, discovery well, swabbed oil at the rate of 11 bbl. per hour before pumping equipment was set up.

Carter Oil Co. has a new pay in Eldorado pool, just north of Eldorado in 8-8s-7e, Saline County. The 1 Turner, SW SE SW recovered 2,020 ft. of clean oil, 120 ft. mud-cut oil, 60 ft. oil-cut mud, no water, on drill-stem test at 2,214-25 ft. The well flowed clean oil on a test of the Aux Vases sand. The well is on the south extremity of the field which has 21 producing wells and 8 dry holes to date. Production is from the Aux Vases and Hardinsburg sand.

NEW MEXICO

SOUTHEAST NEW MEXICO

Roosevelt Wildcat Flows Siluro-Devonian Oil

Amerada Petroleum Corp. 1-C Federal, rank wildcat northeast of Lightcap field, in 10-7s-32e, had prospects of discovery production in the Siluro-Devonian formation. Sample top on the Siluro-Devonian was 9,216 ft., minus 4,742 ft. First drill-stem test from 9,200-9,267 ft. recovered 1,000 ft. of oil and 930 ft. of heavily mud-cut oil with no water.

Second test, from 9,269-92 ft. developed flowing oil in 2 hours, then gaged a total of 32.26 bbl. of oil in 4 hours. Recovery after 4 hours at 9,292-9,317 ft. was 570 ft. of oil and gas-cut drilling mud, and 450 ft. of salt water. Last test reported was from 9,356-9,400 ft., open 4 hours. A small amount of gas showed at the surface and recovery was 450 ft. of gas-cut drilling mud and 360 ft. of salt water. Operators were drilling ahead below 9,434 ft. in dolomite.

New oil in old fields . . . Two Eddy County wildcats were attracting interest to old producing areas. Skelly Oil Co. 6-A Lynch, Pennsylvanian gas-distillate discovery in the Fren field area, has been completed for 196 bbl. of 51.5° oil, (corrected IP), from perforations between 11,962-11,982 ft. Total depth was 13,196 ft. and lowest formation top was the Devonian at 13,161 ft., by samples, on elevation of 3,852 ft. The Wolfcamp section also showed possibilities of production.

Stanolind Oil & Gas Co. had another deep prospect in the Red Lake field, some 20 miles west of the Skelly test. No. 1-AD State in 10-17s-28e, 4 miles southeast of its 1-AB discovery, had total depth at 9,826 ft. and was running electrical surveys.

Drill-stem test from 9,515-60 ft. flowed mud-cut distillate in 1 hour. After cleaning into pits for 15 minutes the gage through

⅝-in. choke was 11.6 bbl. of oil and 17.4 bbl. of salt water the first hour, and 16.5 bbl. of distillate and 12.5 bbl. of water the second hour.

Recovery from a 4-hour test at 9,560-90 ft. was the water blanket slightly cut with distillate, 270 ft. of gas-cut mud and 3,240 ft. of salt water.

Lea County . . . Warren Petroleum Co. 1 Mills-Federal, northeast of Crossroads field, in 11-9s-36e, had prospects of discovery oil in the Abo (lower Permian). Drill-stem test in dolomite, just above the Hueco, from 8,911-9,028 ft. had gas in 15 minutes and recovered 4,409 ft. of clean 39° oil, plus 100 ft. of heavily oil and gas-cut mud. Operators continued drilling below 9,052 ft.

MICHIGAN

By January 22, five outposts in the Bridgewater Township, Washtenaw County play, where W. C. Taggart has one top Traverse oil producer (corrected top of pay 986 ft. at the base of the Antrim shale, and where pay is about 5 to 6 ft. thick) flowing at a restricted rate of 7 bbl. of oil an hour through a ¾-in. choke, had missed pays in both the upper and Alpena chert Traverse sections.

Three of these five had been drilled to a Dundee total depth where sulfur water showed. One was quit 21 ft. in the Alpena zone. Still another was scheduled to be drilled to completion in the Dundee, while yet one other semi-outpost was scheduled to log Traverse before early next week. All of these tests are from ½ to nearly 2 miles out from the discovery. There were a sure five other tests scheduled to be drilled north, northeast and northwest of the 3 Curtis discovery, W½ SW SW 28-4s-4e.

One of the most interesting revelations of the first few tests drilled in the area was the rapid amount of dip found. From a test drilled dry by Union Development Co. at the 1 Kulen Kamp, SE SW SE 19-4s-4e (a −391 on the Alpena chert) to a dry test drilled by Ford Henry at the 1 Allen, SW NW SW 27-4s-4e (a +116 on the Alpena), and on just a 2½ mile east-west to northwest strike, there is a demonstrated 507 ft. of dip. The Taggart wells are an average 170 to 181 minus on the Alpena and all three center around the southwest corner of 28-4s-4e. This is a great deal of dip for Michigan.

Taggart, with detailed information still generally "tight" at his operations, has diagonal southeast and southwest 10-acre offsets to the discovery cased and ready for completion. Both missed top Traverse pays, but both showed either oil and gas or gas on drill-stem test in the Alpena section. Clean-out rig was on the southwest offset, the 6 Curtis-Moeller et al, SE SE SE 29-4s-4e. This test is being given the better chance of the two offsets to develop commercially in the Alpena Traverse.

The entire southeastern Michigan district is rapidly becoming an active leasing area by both independent and major concerns. Ohio Oil Co., Sun Oil Co. and Panhandle Eastern Pipe Line Co. are the most active of larger concerns. Panhandle, with information from gravity meter surveys, has many small lease blocks in Washtenaw, Lenawee and adjoining counties. Ohio Oil Co. is reported to have a core drill working and Sun is ready to move a core drill into the district. The Traverse-Dundee shallow horizons are not being seriously considered as the big things in this area. Most everyone is expecting bigger things to be developed in the Trenton and the shallower Niagaran. It has been reported that some of the deeper salt beds overlying the Niagaran were absent in the Taggart deep test drilled at the same location as the Curtis Traverse oil discovery well.

CALIFORNIA

Pipe Set in Deep Long Beach Test

The Texas Co. last week started testing several potential oil zones in its deep test at the Long Beach Municipal Airport. With hole bottomed at 13,016 ft., 7-in. casing had been set at 12,161 ft. Testing of the 850-ft. section is expected to extend over several weeks, after which a liner possibly will be set.

The well is the first of two deep tests Texaco will make o f the airport. The company last year obtained a lease on the 1,040-acre property, paying a cash bonus of $104,000 and offering a royalty of 42.6 per cent. If oil production is established, development will be by slant holes from several sites adjacent to the field.

Whittier Wildcats Testing

Two wildcats in the Whittier area east of Los Angeles apparently will yield small pumpers. Hearn Co. 1 Reilly in NW NW 30-2s-10w, less than ½ mile north of the Sansinena field, was showing for a 50 bbl. well in upper Miocene sands at approximately 2,950-3,750 ft. In Whittier field 2½ miles west, in NW SE Sec. 22-2s-11w, O. M. Slosson 1 Strong reportedly was pumping oil from the interval 5,138-5,466 ft. The test is about ½ mile west ofthe deeper pool opener completed last fall by Standard Oil Co. of Calif. on its Central Fee lease.

Rio Bravo Deep Pay Extended

Superior Oil Co. 38-34 Kernco was expected to extend Rio Bravo's new deep pay ¾-mile south. On initial production tests the Kern County wildcat flowed 35°-gravity crude at a daily rate of 300 bbl. Production was from the Hebling sand discovered last August by a Union Oil Co. test at 11,600 ft. Total depth of 38-24 Kernco, in SE SW 34-28s-25e, was 11,517 ft.

Los Lobos Activity

Richfield Oil Co. has staked location for two tests in the Los Lobos area on the extreme

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southern end of San Joaquin Valley. In NE NE 35-11n-22w, about 2½ miles southeast of the 9-well field, the company will drill 72-35 San Emidio-E. The second test will be 86-19 San Emidio-E in NE SE 19-11n-23w. The latter will be a ½-mile northwest step-out from its recent Reef Ridge sand discovery, a deeper pay which could greatly increase the field's potentialities.

ROCKY MOUNTAIN

COLORADO

New Baca County Gas Producer Tested

Southwestern Exploration Co. has set casing at 1 State B, NW NW SE 16-32s-41w, Baca County, following drill-stem test which recovered gas at the rate of 600,000 cu. ft. per day. The well is 1½ miles west of the Morton County, Kansas line. Test was of the zone 3,803-3,143 ft. The formation was not identified. Casing was landed at 3,502 ft.

A previous success by Amerada Petroleum Co. and British-American Oil Producing Co. at 1 Neu, SE SE NW 33-2s-41w, was the first producer in the county. It was considered an extension to Greenwood gas field by the operator.

Show Logged in Kiowa County Wildcat

Superior Oil Co. found shows in cores at 65-23 Weisenberger, NW NE SE 23-19s-49w, Kiowa County. Drill-stem test, however, recovered only gas-cut mud. Cores of the zone 4,315-41 ft. were limestone with little porosity, but with vertical fractures and some bleeding oil. The operator is testing above 5,190 ft. with top of Morrow logged at 4,916 ft., and Mississippian at 5,196 ft.

Morgan County Discovery Pumps

Kimbark Co. reported pump gage of 133 bbl. of oil per day on first production tests at 1 Queen, C SW NW 26-1n-56w, Morgan County. Production is from "D" sand 5,144-66 ft. The formation was sandfraced, prior to test. The well is the Sand River pool opener.

Washington Wildcat Flows Oil at High Hourly Rate

Continental Oil Co. 1 Selby in the Bijou View area of Washington County, 2 miles northeast of Little Beaver pool production, flowed oil on test of the "D" sand at the rate of 43 bbl. per hour.

There are dry holes between the new discovery and Little Beaver production. The well is 4 miles west of Woodrow, Colorado.

WYOMING

New Mesaverde Discovery Tested in Green River Basin

The Texas Co. has tested gas at the rate of 8,980 M.c.f. per day at 5 Unit, C SE NE 2-18n-98w in the Table Rock unit, Sweetwater County. The deep test which went to 10,077 ft. produced from six perforated zones within the Mesaverde, and is the first to test this formation in the unit. Previous production has been from Tertiary. Casing was landed at 6,730 ft., and perforated 6,249-54, 6,286-94, 6,305-53, 6,584-85, 6,564-76 and 6,626-30 ft. No tops have been reported.

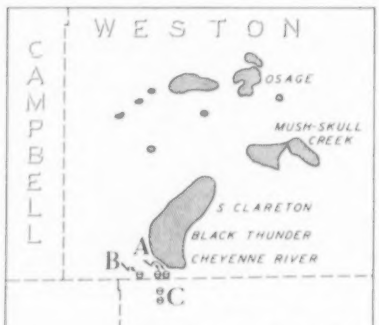
Exploration to the Mesaverde sandstone which is a major producing horizon in northwestern New Mexico gas fields, has gained in importance in the Green River basin during the past 2 years, with two fields opened in that time in Wyoming, and one found in Colorado, in the southern part of the basin. Further exploration is in prospect for the area in the near future with the Mesaverde the principal objective, and production of gas a major consideration.

Sublette County Wildcat Is Gas Discovery

General Petroleum Corp. is preparing to complete its wildcat in the Tip Top area of Sublette County as a gas discovery with production from Frontier. The well, 18-20-G SW SW SW 20-28n-113w, was drilled to a total depth of 8,384 ft., and was in Beckwith at that depth. The formation had slight shows in cores, but only mud was recovered on drill-stem tests. A flow of 1,400 M.c.f. of gas per day was tested in Frontier, and the well is to be plugged back and completed in that formation. General Petroleum found oil production in Nugget sand in this general area in 1951, and the discovery well also had substantial gas shows in Frontier. It was completed as an oil well.

Second Niobrara County Newcastle Discovery Testing

H & H Drilling & Oil of Newcastle reported a flow of 50 bbl. of oil per day at 1 Government, C NW NW 14-40n-66w, Niobrara County. Production is from Newcastle sand at 7,620-36 ft. The well was fractured before testing. The apparent discovery is 2 miles south of the Cosden Petroleum Co.-R. L. Manning-Wind River Oil Co. discovery at 1-A Government-Maule, C NW SW 3-40n-66w, which has been completed for a flow of 180-190 bbl. of oil per day through 26/64-in. choke. This latter well is 4 miles south of previous production in the Cheyenne River area of Weston County, and is the first Newcastle producer in Niobrara County.



H. & H. Drilling & Oil Co. reports flow of 50 bbl. of oil daily at 1 Government, C NW NW 14-40n-66w, Niobrara County (C on map). The well is 2 miles south of the recent Cosden Petroleum et al 1-A Government-Maule, C NW SW 3-40n-66w, which was the first Newcastle producer in Niobrara County (C on map). Trigood Oil Co. is preparing for tests at 1-A Government-Murray, C SW NE 27-41n-66w (A on map), which has shown for Newcastle production. Vickers Exploration Co. is drilling below 7,288 ft. at 1 Government-Canada Southern in C NE NE 32-41n-66w (B on map).

NORTH DAKOTA

Weather Slows Williston Basin Operations

Temperatures which planned as low as 53 degrees below zero and stayed well below zero for several days in some areas put an effective brake on operations in the Williston basin. The average footage made for 12 exploratory wells in North Dakota over a 7-day period was 405 ft. Twenty-four rigs, both infield and exploratory averaged 750 ft. per well over the same period. Complete winterization of equipment through the Williston basin may be credited with the fact that there were few actual shutdowns. Operations in the Border area of Montana were hardest hit by cold weather, with most of the drilling in the area at a standstill following the record low of minus 53 degrees.

Central North Dakota Wildcat Staked

Calvert Exploration Co. has made location for 1 Ranberg, C NE SE 17-154n-72w in Pierce County. The well is 7 miles east of a previous failure by this operator. The firm has done a considerable amount of drilling through central and eastern North Dakota during the past 2 years.

The new wildcat is on acreage farmed out by Cities Service Oil Co., and Hunt Oil Co. and Socony-Vacuum Oil Co. also interested.

MONTANA

Cabin Creek Extension Blows Out

Shell Oil Co.'s 11-33NP, C NW NW 33-10n-58e, extension to the Cabin Creek discovery, Fallon County unloaded and blew out of control while the operator was pulling core from Ordovician below 10,100 ft. A strong blow of nitrogen gas from a hole in casing at about 7,400 ft. was responsible. The well went out of control during 30 degrees below zero weather, and control operations were considerably slowed by weather. The gas zone, in Madison, was cased off prior to drilling deeper. Blow was estimated at the rate of 2,500 M.c.f. per day following blowout.

Golden Dome Dakota Test Planned

Cities Service Oil Co. has made location for a Dakota test at 1 Kelly, C SW SW 12-7s-22e, in the Golden Dome area, Carbon County. The well is 1 mile northeast of Kirk Oil Co.'s discovery at 1 Stow, NW NW SE 14-7s-22e, completed in 1953 for 16 bbl. of oil per hour. There has been previous drilling to the west and southwest of the discovery on the highly faulted structure, but the current test is the first to the northeast.

APPALACHIAN AREA

WEST VIRGINIA

In Moorfield district, Hardy County, West Virginia, United Fuel Gas Co. 8011-T, H. & E. Davidson, deep wildcat, elevation 1,686 ft.,

was dry, Oriskany sand 6,951 ft., show of gas 7,032 ft. Helderberg 7,298 ft., TD 7,322 ft. The show of gas in the Oriskany sand soon exhausted after shot. Roaring Creek district, Randolph County, Fox-Thimble · 1 J. T. & B. Brennan, elevation 2,480 ft., resulted in 28,000 cu. ft. gas, Fifth sand 2,179-2,228 ft., gas 2,182-2,186 ft., TD 2,283 ft.

Buffalo Township, Washington County, southwest Pennsylvania, Washington Oil Co. 1 Kelly-Southerland, reached the Oriskany sand at 7,098 ft., and its drilling at 7,125 ft.

OHIO

The best results from fracturing sand in the Somerset area was obtained in Preston Oil Co. 3 Blanche-Foucht, Section 18, Hopewell Township, Perry County. Clinton sand was found at 2,742-2,770 ft. with a very good oil pay natural, which after treatment, flowed 450 bbl. in 24 hours.

The second oil well to be completed in Sandy Township, Tuscarawas County, was drilled by Natural Gas on 2 Devers and Hazlett, Lot 4. The pay was in the lower Clinton at 2,924-2,927 ft., and made 30 bbl. in 25 hours after shot. The area immediately to the west is part of the large Sandyville gas field.

LOUISIANA

NORTH LOUISIANA

Deep Springhill Test Slated by Shell Oil

Location for a proposed 11,000-ft. Smackover test on the west edge of Springhill field has been announced by Shell Oil Co. The important wildcat will be 1 Gladys Braley, C NW NW 11-23n-11w, Webster Parish.

The drill site was selected on seismic work findings. It is located about 12,500 ft. west-southwest of Shell Oil Co.-Mid-Continent Petroleum Corp. 1 Browning-Burns unit, 12-20s-23w, deep hole north of Springhill in Columbia County, Arkansas, the discovery well of big Springhill field. This wildcat was at total depth of 12,650 ft. in the Buckner. It was abandoned in 1952, but later reworked and completed in the shallow Tokio as the discovery well of the field.

SOUTH LOUISIANA

New Beauregard Field

Potential gage at Vincent & Welch, Inc.'s new discovery well, 1 Walker, in 24-5s-7w, southeast of Dry Creek, in southeastern Beauregard Parish, near the Allen Parish line, recorded a flow of 9.36 bbl. of oil and 4,385,000 cu. ft. of gas in 24 hours through 9/64-in. choke with 1,400-psi. pressure. Producing interval is 5,008-09 ft. Hole was drilled to 9,200 ft.

Vermilion Wildcat Makes Gas-Condensate Discovery

Preliminary tests at Houston Oil Co.'s indicated discovery well 15 miles south of Abbeville, in Vermilion Parish, indicate a sizable gas-condensate producer.

The well, 1 Godcuaux, testing casing perforations at 12,900-10 ft. through drill stem with ¾-in. chokes, flowed at an estimated rate of 5,500,000 cu. ft. of gas and 275 bbl. of condensate per day. Shut-in pressure gaged 3,650 psi. Mechanical difficulties have delayed completion.

Location, in 88-14s-3e, is approximately 8 miles southwest of Erath field, one of the state's largest gas-condensate producing areas.

Luling Discovery Well Completed as Pumper

California Co.'s new discovery well, 1 Levert, 2 miles southeast of Luling, in St. Charles Parish, has been placed on the pump with daily production of approximately 100 bbl. of 36.5°-gravity oil without any water.

Initial porduction was by natural flow at the rate of 132 bbl. of oil daily through 7/64-in. choke, but steady flow could not be maintained. Pay zone is in Miocene sand, open through casing perforations at 10,924-40 ft., with bottom of the hole at 11,382 ft.

Location, in 27-13s-21e, about 20 miles west of New Orleans, is 6 miles north of Pan American Production Co.'s deep multi-pay Boutte field, discovered early in 1953, and in which five wells have been completed.

New Krotz Springs Well Extends Producing Area

Productive area of Krotz Springs field, in St. Landry Parish, has been extended a mile to the south with a gas-condensate well now being completed by The Texas Co.

The well, 1 State-Neal Unit 1, in 6-7s-7e, flowed 124 bbl. of 53.3°-gravity condensate with 1,400,000 cu. ft. of gas per day on 14/64-in. choke. Production is from a casing-perforated interval at 8,198-8,200 ft. in hole drilled to 11,586 ft.

Krotz Springs, discovered in 1942 and productive from Frio and Cockfield sands to depths below 10,000 ft., is proving one of the district's largest gas-condensate areas.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: Armstrong & Horn 1 Adams, Jose M. Moradio Sur., Blk. 4. Dry. TD 4,238 ft.

Frio Production Co. 1 Smith, Sec. 484, I&GN Sur., A-449. Dry. TD 2,722 ft.

Sutton Drilling Co. 1 Wilson, Henry H. Wood Sur., A-92. Dry. TD 3,921 ft.

Duval County: F. W. Carr 1 DCRC, Tract 18, Duval County School Land Sur. 196, A-853 ft. Dry. TD 2,530 ft.

Hidalgo County: Sunray Oil Corp. 3 Beaurline, Santa Anita Grant. IP 8,600 M.c.f. daily, open flow, casing perforations 5,546-56 ft. TD 8,506 ft. (New pay in Beaurline field.)

Jim Hogg County: George H. Coates 1 Dannelley et al, CB&CNG Sur. 154, A-272. IP 29.2 BOPD, 12/64-in., 30°, casing perforations 2,554-59 ft. TD 2,561 ft. (New field—South Manila.)

George H. Coates 2 Dannelley et al, CB&CNG Sur. 154, A-272. Dry. TD 2,906 ft.

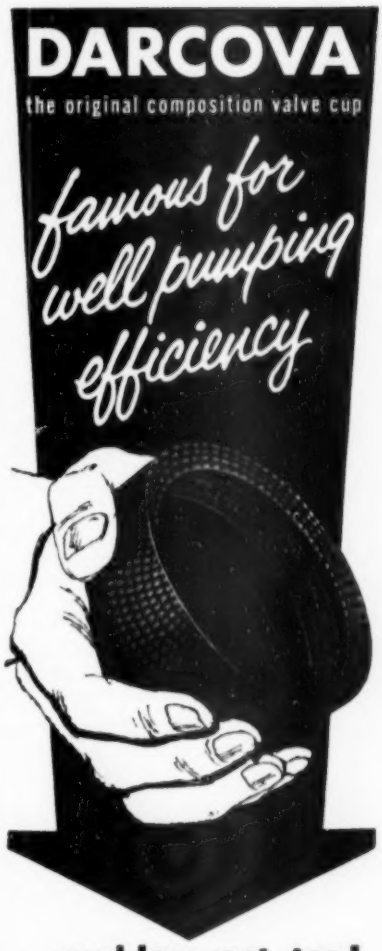
Sam Cunningham and Rodney DeLange 1 Yeager, AB&M Sur. 167, A-28. Dry. TD 3,718 ft.

Jim Wells County: Appell Oil & Gas Corp. 1 Embleton, Blk. 9, Al Smith Farms Subd., Los Presenos de Abajo Grant. Dry. TD 3,415 ft.

Charles A. Daubert 1 Schroedtor, Lot 46, A. J. Zander Farm Lots, J. Reynolds Sur. 116, A-398. Dry. TD 5,181 ft.

Charles A. Daubert 1 Meisenheimer, Share 4, La Tinaja de Lara Grant, A-36. Dry. TD 5,420 ft.

Edwin Singer, Jr. 1 Misenheimer, Share



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WILDCAT COMPLETIONS

8A, Los Presenos de Abajo Grant, A-171. IP 66,000 M.c.f. daily, open flow, casing perforations 5,442-47 ft. TD 5,595 ft. (New field—Presenos.)

Medina County: V. E. Nicholson 1 Jungmann estate, J. Huff Durst et al Sur. Dry. TD 1,037 ft.

Milam County: Ralph Myers Contracting Co. 1 Barton, Sara Wilhelm Sur., A-69. Dry. TD 3,938 ft.

Nueces County: Willard Shuart 1 Smith, Sec. 33, Laureles Farm Tracts. Dry. TD TD 6,650 ft.

San Patricio County: Jake L. Hamon 1 Bodenhamer, Lot 12, Schleicher & Joseph Sur. Dry. TD 4,875 ft.

Stanolind Oil & Gas Co. 6 Welder Ranch, V. Tares & P. Villareal Grant. IP 2,872 M.c.f. daily with 10 BC per M.M.c.f., ¼-in., casing perforations 5,596-5,600 ft. TD 8,019 ft. (Extends O'Neil field.)

Starr County: Russell MaGuire and R & S Oil Co. 1 Longfellow, Sur. 758. Dry. TD 5,821 ft.

Travis County: B. R. Floyd 1 Johnson, H. O. Rodriguez Sur. Dry. TD 1,309 ft.

Frank Levy 1 Whetsell, William Lewis Sur. Dry. TD 1,050 ft.

Webb County: F. W. Carr 1 Bruni, Borrego Grant. Dry. TD 1,515 ft.

Hawn Brothers et al and Nordan & Gaines 1 Raul de la Garza, Blk. 3, E. D. Blaggett Subd., GC&SF Sur. 263, A-1356. Dry. TD 1,784 ft.

H. E. Nessly 1 Marrs McLean estate, Blk 1, CCSD&RGNG Sur. 61. Dry. TD 2,110 ft.

Williamson County: Roy C. Hindes 1 Williams & Hindes and R. G. Lange, H. White Sur. Dry. TD 1,263 ft.

John Kubicek et al 2 Fee, P. J. Mahan Sur. Dry. TD 840 ft.

TEXAS GULF COAST

Goliad County: Paul E. Daugherty et al 1 Hall, James T. Kilgore Sur., A-172. Dry. TD 4,250 ft.

Vaughn, Zoch & Turnbull et al 1 Albrecht, V. Ramos Grant, A-243. Dry. TD 7,829 ft.

Harris County: James R. Buck 1 Hunt et al, Samuel W. Upshaw Sur., A-281. Dry. TD 7,893 ft.

H. J. Chavanne, trustee, 1 Pye, Blk. 43, John N. O. Smith Sur., A-691. Dry. TD 8,101 ft.

Jack W. Frazier 2 Roy Allison et al, Lot 292, William Lovett Sur., A-526 (Mykawa townsite). Dry. TD 6,043 ft.

Jackson County: A. W. Cherry et al 1 Bennett, Ramon Musquiz Grant. Dry. TD 8,603 ft.

Magnolia Petroleum Co. 1 Fenner, Samuel Chance Sur., A-11. Dry. TD 4,811 ft

South Texas Oil & Gas Co. 1 Laughter, William Whitaker Sur. IP 60,000 M.c.f. daily, open flow, casing perforations 3,975-77 ft. TD 4,100 ft. (New field.)

Jasper County: Houston Oil Co. and American Republics Corp. 1 Adams et al, W. A. Grant Sur., A-166. IP 35,700 M.c.f. daily, open flow, casing perforation 7,006-10 ft. TD 7,767 ft. (New field.)

Lavaca County: Horace Coon, Jr., 1 Allen, SA&MG Sur., A-442. Dry. TD 3,706 ft

Live Oak County: Ada Oil Co. 1 Nichols, Simeon Ryan Sur., A-35. Dry. TD 7,505 ft.

Polk County: Continental Oil Co. 1-B Carter et al, John Swinney Sur., A-524. Dry TD 12,031 ft.

Tyler County: Shell Oil Co. 1 Kirby, Tract 168-A, Mrs. Sarah Fields Sur., A-802. IP 80 BOPD, ¼-in., 44°, Wilcox 9,032-43 ft. (casing perforations). TD 9,205 ft. ft. (New pay in Wurtzbaugh field.)

Victoria County: Fidelity Oil & Royalty Co. 1 Haynes, Felipe Dimitt Sur., A-20. Dry. TD 4,200 ft.

A. T. Jergins 1-A Fetters, J. M. Corarrubias Sur. Dry. TD 4,714 ft.

Arnold O. Morgan 1 Murphy, Felipe Dimmit Sur., A-20. Dry. TD 9,015 ft.

Arnold O. Morgan 3-C Welder, Luciana Navarro Sur., A-89. Dry. TD 9,020 ft.

Waller County: Humble Oil & Refining Co. 1 Brookshire Oil Unit 1, William Cooper Sur. Dry. TD 8,500 ft.

EAST TEXAS

Bowie County: J. K. Wadley 1 Morris, Levi M. Richardson Sur., A-494. Dry. TD 4,470 ft.

Cherokee County: B. E. Gant 1 Norman Estate, J. E. Engledow Sur., A-16. Dry. TD 4,160 ft.

Hunt County: B. B. Banner 1 Harry Cross, H. Banta Sur., Dry. TD 3,010 ft.

Smith County: D. D. Feldman Oil & Gas Co. 1 Verner Estate, Joseph Del Sur. 213, A-298. Dry. TD 5,044 ft.

Wood County: W. A. Byrd 1 Mills, F. L. Smith Sur., A-522. Dry. TD 4,432 ft.

TEXAS PANHANDLE

Dallam County: Panoma Corp. 1-A Adolph Hill, Sec. 10, Blk. 19, Capitol Syndicate Sur., 30 miles NW Permian gas well in Hugoton field. Dry. TD 5,940 ft.

Hansford County: Humble Oil & Refining Co. 1 East Gruver Gas Unit, 111-45-H&TC, 3½ miles N Hansford. IP 26,500,000 cu. ft. gas, 23 bbl. distillate, Douglas sand 4,960-80 ft. TD 9,118 ft. Elev. 3,153 ft.

The Texas Co. 1 Blakemore, 30-4T-T&NO, 10 miles NE Hansford. IP 6,850,000 cu. ft. gas, Morrow sand 7,356-70 ft. TD 10,010 ft. Elev. 3,083 ft.

Hartley County: Shamrock Oil & Gas Corp. 1 Dammier, 7-LE-G&M, 6 miles NE Romero. Dry. TD 6,113 ft. Elev. 4,023 ft., Cimarron 2,565 ft., pre-Cambrian 6,070 ft.

Parmer County: Gulf Oil Corp. 1-A Keliehor, Lge. 2, Gregg CSL Sur., 10 miles NE Friona. Dry. TD 9,628 ft. Elev. 4,007 ft., Abo 5,410 ft., Wolfcamp 6,320 ft., Mississippian 9,390 ft.

WEST CENTRAL TEXAS

Callahan County: Currie & Wylie and M. D. St. John 2 John Windham, J. O. Young Sur. 523. Dry. TD 2,175 ft.

Johnson & Warren 1 Odom Heirs, Sec. 15, BBB&C Sur. Dry. TD 1,753 ft.

Johnson & Warren 1 Scott, Mial Scurlock Sur. 207. Dry. TD 1,909 ft.

Coleman County: Bay Petroleum Corp. 1-A DePrang, Sec. 4, EL&RR Sur. Dry. TD 3,978 ft.

McKissick-McGiven-Robinson et al 1 Allen, Blk. 8, J. H. Grimes Sur. 710. IP 120 BO 8 hr., 16/64-in., 42°, Morris sand 2,474-79 ft. TD 2,496 ft.

Miller & Banks 1 Williams, Blk. 6, Coleman CSL. Sur. 57. Dry. TD 2,082 ft.

Sohio Petroleum Co. 1-A Sealy-Smith, Sec. 103, GH&H Sur. Dry. TD 3,453 ft.

Eastland County: Bankline Oil Co. 2 Hansen, 501-1-SPRR. Dry. TD 3,962 ft.

Fisher County: C. E. Heard, E. S. Heyser and Noranda Oil Corp. 1 Key, 2-2-H&TC. Dry. TD 5,800 ft.

Bailey Balken 1 Pyron, J. A. Langston Sur. Dry. TD 3,518 ft. Elev. 1,870 ft., Flippen 3,080 ft.

Haskell County: Thos. D. Humphrey & Sons 2 Hester, Sec. 160, W. Dunn Sur., A-121. Dry. TD 3,975 ft.

Jones County: S. C. Herring Drilling Co. 1 Rainwater, 21-2-SPRR. Dry. TD 5,642 ft.

United States Oil Co. 1 Eck Gillespie, Sec. 206, BBB&C Sur. Dry. TD 2,840 ft.

Onyx Oil Co. and J. H. Staley 1 Triplett, 21-15-T&P. Dry. TD 2,750 ft.

Nolan County: British American Oil Producing Co. 1-H Wilson, 280-64-H&TC. Dry. TD 6,243 ft.

Palo Pinto County: G. A. Eriksen 1 Heath, 60-2-T&P Sur. Dry. TD 4,712 ft.

Shackelford County: Deer Drilling Co. 1-A Nail, Sec. 104, ETRR Sur. Dry. TD 1,443 ft.

Stephens County: Howsley & Jacobs 1 Cowart, 40-4-T&P. Dry. TD 1,633 ft.

Stonewall County: Sid Katz Exploration Co. 1 Anna Hankins, T. C. Snailum Sur. IPP 42.5 BOPD, 39°, pay 5,859 ft. TD 5,991 ft.

Taylor County: Howsley & Jacobs 1 Collins, 21-18-T&P. Dry. TD 5,107 ft.

Throckmorton County: D. D. Feldman 1 Lizzie Smith, Sec. 228, BBB&C Sur., A-1125. Dry. TD 4,574 ft.

NORTH TEXAS

Archer County: Archer Drilling & Production Co. 3 Birdwell, Sec. 2418, TE&L Sur. IPP 46 BOPD, 39°, pay 1,327 ft. TD 1,329 ft.

Archer Drilling 1 Hyer, Sec. 2417, TE&L Sur. IPP 40.7 BOPD, 38°, pay 1,295 ft. TD 1,296 ft.

M. W. Blair 3 Hamel, Lge. 4, Denton CSL Sur. Dry. TD 751 ft.

J. Earle Gray 1 Lowe, Blk. 2, Isaac Holman Sur. Dry. TD 1,246 ft.

Fish & Utter 1 Farmer, Blk. 31, Perkins Subd., J. Chisholm Sur. IP 36 BOPD, pay 1,347 ft. TD 1,358 ft.

Clay County: N. G. Landrum 1 Bevering, Sec. 7, BBB&C Sur., A-63. Dry. TD 3,174 ft.

Cooke County: Redman Brothers 1 Harris, SPRR Sur., A-970. IP 84 BOPD, 12/64-in, 40°, pay 2,484 ft. TD 2,960 ft.

Sun Oil Co. 1 Bean, Thomas Toby Sur. IPP 155 BOPD, Strawn pay 3,612 ft. TD 4,270 ft.

Grayson County: Howell, Holloway & Howell 1 Patterson, Asa Hartsfield Sur. Dry. TD 5,594 ft.

Howell, Holloway & Howell 1 Pearce, Sarah Cross Sur., A-210. Dry. TD 4,328 ft.

L. O. McMillan 1 Banfield, E. Hartzog Sur. Dry. TD 7,606 ft. Oil Creek sand 7,598 ft.

Hardeman County: Sun Oil Co. 1 Sorenson, 70-H-W&NW Sur. Dry. TD 8,352 ft.

Jack County: C. U. Bay et al 1 H. E. Voyles, Elizabeth Smith Sur., A-524. Dry. TD 3,800 ft.

Bilbrey & Albritton 1 Voyles, SPRR Sur., A-580. Dry. TD 600 ft.

Bridwell Oil Co. 2 Prideaux, Elizabeth Smith Sur., A-524. Dry. TD 702 ft.

Russell Maguire 1 Richards 424, MEP&P Sur., A-424. IP 204 BOPD, 18/64-in., 42°, conglomerate pay 5,056-66 ft. TD 5,224 ft.

Rock Island Refining Corp. et al 1 First National Bank of Jacksboro, T. Morris Sur., A-1141. Dry. TD 3,405 ft.

Star Oil Co. 1 Box, J. G. Enlow Sur., A-2011. Dry. TD 4,745 ft.

Wichita River Oil Corp. 1 Sonora Coyle, Sec. 10, Freestone CSL, A-144. IP 318 BOPD, 16/64-in., conglomerate pay 5,830-35 ft. TD 5,864 ft.

Knox County: Miami Operating Co. 2 Beavers, 237-44-H&TC. Dry. TD 6,156 ft.

Montague County: Edwin L. Cox 1 Sledge, W. R. Dean Sur., A-105. Dry. TD 6,551 ft.

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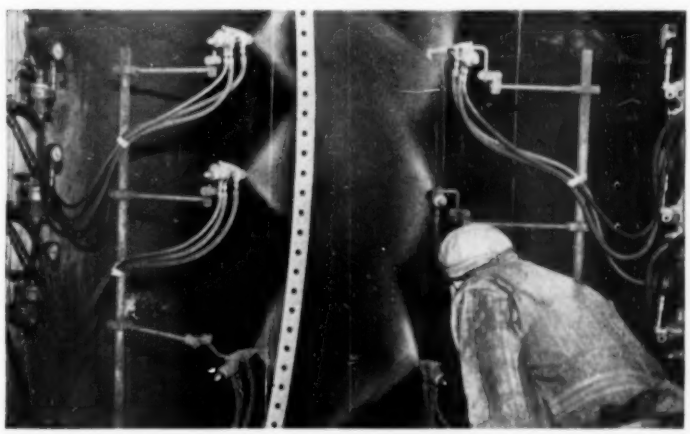

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WILDCAT COMPLETIONS

51, J. H. Belcher Subd. Dry. TD 5,730 ft.

Wichita County: Hull Oil Co. 1-E Burnett, Blk. 9, HT&B Sur., A-135. IPP 19 BOPD, 40°, sand pay 995 ft. TD 1,006 ft.

Loggie Brothers 1 Smellage, Blk. 13, H&GN Sur., A-146. IPP 5 BOPD. 40°, sand pay 287 ft. TD 304 ft.

Shanor & Pardo 1-A Waggoner Estate, 28-5-H&TC. Dry. TD 1,951 ft.

Wilbarger County: Roy Farrell 1 Waggoner, 10-14-H&TC. Dry. TD 3,311 ft.

Fortex Oil Co. 1-B Waggoner, 37-4-H&TC. TD 2,601 ft.

Ben L. Lowell 1-L Waggoner, G. R. Powell Sur., A-1913. Dry. TD 1,990 ft.

Frank Wood 2 Waggoner, 40-A494-ME-P&P. Dry. TD 1,148 ft.

Wise County: Miles Production Co. 1 Pearson, Sec. 43, MEP&P Sur. Dry. TD 3,871 ft.

Young County: Hayden Farmer 1 Lee, TE&L Sur. 207, A-454. IPP 16 BOPD, pay 759 ft. TD 765 ft.

Hayden Farmer 2 Lee, Blk. 207, TE&L Sur. Dry. TD 815 ft.

J. Earle Gray 1 Little, Blk. 2, I. Holeman Sur. Dry. TD 1,280 ft.

WEST TEXAS

Coke County: Liedtke & Liedtke 1 Johnston, 66-16-H&TC. Dry. TD 7,700 ft. Strawn 7,338 ft., Ellenburger 7,546 ft.

Crockett County: Deep Rock Oil Corp. 1-A Bouscaren Heirs, Sec. 29, HE&WT Sur. Dry. TD 2,200 ft.

LaGorce Oil Co. 1 Martin, 39-OP-GC&SF. Dry. TD 1,221 ft.

W. M. Lyle 1 Harris Estate, 16-HH-GC&SF. Dry. TD 3,515 ft.

John I. and P. D. Moore 1-A Harris, 6-HH-GC&SF. Dry. TD 8146 ft. Elev. 2,721 ft., Devonian 7,220 ft., Ellenburger 7,975 ft.

Irion County: B. J. Phillips 2 Bean, 14-3-H&TC. TD 1,138 ft.

Kimble County: Hunt Oil Co. 1 Bode, Sec. 36, Blk. 4. Dry. TD 3,219 ft. Ellenburger 2,975 ft.

Midland County: Reynolds Mining Corp. 1 Roy Parks, 26-41-T3S-T&P. IP 407 BOPD, 16/64-in., 43°, Pennsylvanian pay 10,170 ft. TD 10,531 ft.

Stanolind Oil & Gas Co. 2-AF Midland Farms "B," 1-40-T1S-T&P. Dry. TD 4,714 ft.

Pecos County: Tiger Minerals, Inc. 1 Smith, 6-118-T&STL Sur. Dry. TD 3,260 ft.

Reeves County: Quinco Oil Co. 1-B Batmorhea Ranches, 113-1-H&TC. Dry. TD 5,360 ft. Elev. 2,972 ft., Delaware sand 5,304 ft.

Runnels County: Henson Drilling Co. 1 Russell Derden, G. Russell Sur. 543. Dry. TD 4,147 ft.

Thos. D. Humphrey & Sons 1 Buckalew, W. L. McAuley Sur. 1296. Dry. TD 4,377 ft.

Walter Duncan 1 Caudle, John Brown Sur. 528. IP 70.8 BOPD, 16/64-in., 40°, pay 2,601 ft. TD 2,605 ft.

Schleicher County: Hiawatha Oil & Gas Co. 1 Mackel, 66-TT-TCRR. Dry. TD 6,995 ft. Elev. 2,277 ft., Pennsylvanian 6,360 ft., Ellenburger 6,750 ft.

E. C. Meadows 1 Thomson, 68-A-HE&WT. Dry. TD 602 ft.

L. E. Scherck 1 Wilson, 46-8-TW&NG. Dry. TD 4,150 ft. Elev. 2,237 ft., Palo Pinto 4,008 ft.

L. E. Scherck 2-A Wilson, 10-V14-M. Neurndorff Sur. Dry. TD 1,475 ft.

Sutton County: Benedum-Trees Oil Co. 1 DeBerry, Sec. 15, GC&SF. Dry. TD 7,507 ft. Elev. 2,308 ft., Strawn 6,970 ft., Ellenburger 7,302 ft.

Vincent & Welch, Inc. 1 Valliant, 13-5-TW&NG. Dry. TD 4,436 ft. Elev. 2,402 ft., Strawn 4,094 ft., Ellenburger 4,406 ft.

Tom Green County: New Seven Falls Co. 1 Johnson, Samuel Woodhouse Sur. 1815. Dry. TD 6,345 ft. Elev. 2,040 ft., Strawn 5,280 ft., Ellenburger 6,230 ft.

C. L. Norsworthy, Jr. 1 Hoblett & Jacobs, A. J. Flowers Sur. 1132. Dry. TD 6,765 ft. Elev. 2,144 ft., Strawn reef 6,210 ft., Ellenburger dolomite 6,552 ft.

Upton County: Hunt Oil Co. 1 V. T. Amacker, 106-D-CCSD&RGNG. IP 409 BOPD, ¼-in., 53°, Ellenburger 11,983-12,127 ft. TD 12,127 ft.

NORTHERN NEW MEXICO

San Juan County: Honolulu Oil 1 Navajo, C NW NW 6-31n-17w. Dry. TD 8,676 ft. Ignacio 8,665 ft.

SOUTHEAST NEW MEXICO

Lea County: Amerada Petroleum Corp. 1-C State WE, 5-21s-35e. Dry. TD 7,955 ft. Elev. 3,652 ft., Delaware sand 5,740 ft., Bone Springs 7,788 ft.

Fullerton Oil Co. 1 Bradley, 36-25s-32e. Dry. TD 4,953 ft. Elev. 3,352 ft., Delaware sand 4,765 ft.

ILLINOIS

Clark County: T. M. Prueti 1 Stanfield, N½ NE SE 18-10n-13w. Dry. TD 586 ft.

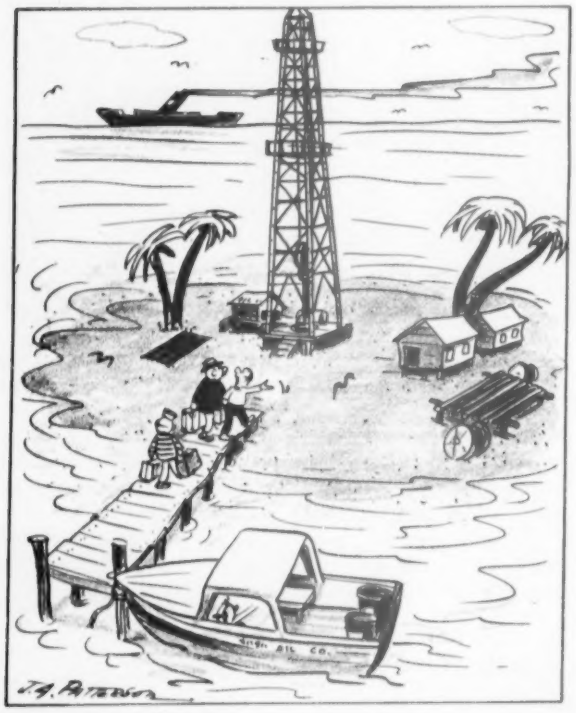
Clinton County: L. Kapp 1 Gherardine, NE SW SE 17-1n-1w. Dry. TD 1,384 ft.

Jasper County: Harry D. Mark 1 Leamon, SE SW SW 4-8n-14w. Dry. TD 1,390 ft.

Jefferson County: Theo. Lindsay 1 Brooks, SE SE NE 4-2s-4e. Dry. TD 3,054 ft.

Madison County: C. G. Rissler 1 Meier, SE SE NE 4-5n-6w. Dry. TD 616 ft.

Saline County: Superior Oil Co. 1 Thomas, SE SW NE 25-8s-6e. Dry. TD 3,010 ft.



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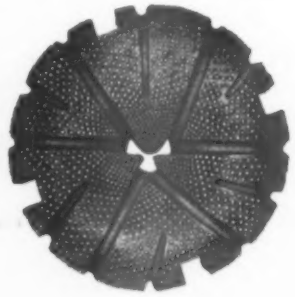

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WILDCAT COMPLETIONS

Pure Oil Co. 1 Quick, NW NE NE 5-8s-6e. Dry. TD 3,298 ft.
Shelby County: R. H. McDaniel 1 Weber, SW SE NE 29-12n-2e. Dry. TD 2,875 ft.
Washington County: A. M. Fowley 1 Ochs, N½ NE SW 3-1s-4w. Dry. TD 2,325 ft.

WESTERN KENTUCKY

Muhlenberg County: J. C. Miller and Ashland Oil & Refining Co. 1 Wheeler, SE SE NW SE 9-J-27. Dry. TD 2,530 ft.
Hampton Development Co. 1 McIntosh, SE SW NE SE 13-H-29. Dry. TD 1,175 ft.
Webster County: Slagter Production Co. 1 Zieman, NW NW SW NW 8-N-24. Dry. TD 2,642 ft.

INDIANA

Dubois County: Mulzer Bros. 1 Gelhausen, NW NE SW 29-3s-5w. Dry. TD 1,101 ft.
C. N. Frazer 1 Olser, SE SE NW 18-3s-4w. Dry. TD 1,005 ft.
Stecker & Rea 1 Arenshman, SW NE NE 2-3s-5w. Dry. TD 935 ft.
Stecker & Rea 1 Hackman, SW NE SW 2-3s-5w. Dry. TD 596 ft.
Stecker & Rea 2 Hurst, NE NW SW 2-3s-5w. Dry. TD 635 ft.
Gibson County: Calvert Drilling Co. 1 Blood, SW SE NE 14-3s-14w. Dry. TD 2,378 ft.
Hendricks County: Dome-Mimick 1 Hayworth, NW SE SE 5-14n-1w. Dry. TD 1,700 ft.
Parke County: Redgrave Petroleum Co. 1 Withers, SE SW SE 35-14n-8w. Dry. TD 1,485 ft.
Vigo County: F. L. Runyon 1 Liston, SW SE SW 27-10n-8w. Dry. TD 1,946 ft.

MICHIGAN

Allegan County: E. Edwin Brehm 1 Mileskiewicz, NW SE SW 34-2n-16w. Dry. TD 1,192 ft. in Traverse lime.
Tri-County Development Co. 1 Breck, SW SE SE 27-1n-12w. Dry. TD 1,510 ft. in Traverse lime.
Cook Drilling Co. 1 Guerrant-Warner Comm., SW SW NW 34-2n-12w. Dry. TD 1,513 ft. in Traverse lime.
Bay County: Admiral Oil Corp. 1 McGillis, SE NW NW 17-16n-3e. Dry. TD 2,606 ft. in Traverse lime.
Oceana County: Lowell Bernhardt 1 Swinton, NW NE SW 11-14n-16w. Dry. TD 2,104 ft. in Traverse lime.
Van Buren County: Ford Oil Co. 1 Fouts, N WNE SW 24-4s-15w. Dry. TD 1,011 ft. in Traverse lime.

WEST VIRGINIA

Hardy County, Moorfield district: United Fuel Gas Co. 8011-T H. & E. Davidson, elevation 1,686 ft. Dry. Oriskany sand 6,951 ft., show gas 7,032 ft., Helderberg 7,298 ft., TD 7,322 ft.
Randolph County: Fox-Trimble 1 J. T. & Brennan, elevation 2,480 ft., 28,000 cu. ft. gas, Fifth sand 2,179-2,228 ft., gas 2,182-2,186 ft., TD 2,283 ft.

FLORIDA

Santa Rosa County: Gulf Oil Corp. 1 State Lease 833, Lot 4, 23-1s-28w. Dry. TD 6,245 ft. Elev. 14 ft., Wilcox 2,090 ft. Eagle Ford 5,890 ft.
British-American Oil Co. 1 Rosasco, NE NW SE 24-4n-28w. Dry. TD 6,810 ft. Elev. 83 ft., lower Cretaceous 6,458 ft.

ALABAMA

Choctaw County: R. C. Pugh 1 Bolinger, trustee, C SW SE 28-10n-4w. Dry. TD 4,120 ft.

MISSISSIPPI

Leake County: Petersen Drilling Co. 1 Sweeney, SW NE NW 6-9n-6e. Dry. TD 7,193 ft. Elev. 325 ft., Eutaw 4,666 ft.
Madison County: Como Drilling Co. 1 Joiner, C NW NW 17-9n-4e. Dry. TD 5,552 ft.
Pearl River County: D. P. Hamilton and Crow Drilling Co. 1 Southern Minerals-Crosby, C NE SE 17-3s-15w. Dry. TD 9,021 ft. Elev. 334 ft., Wilcox 3,365 ft., lower Tuscaloosa 8,632 ft., Massive 8,878 ft.

SOUTH LOUISIANA

Acadia Parish: Hassie Hunt trust 1 Hayes, 34-8s-1w. IP 25 BCPD and 4,500 M.c.f. daily, 11/64-in., 51.5°, casing perforations 11,257-67 ft. TD 11,306 ft. (New field.)
Southern Minerals Corp. 1 Frey, 24-7s-1w. IPP 24 BOPD, 23°, casing perforations 4,203½-08½ ft. TD 9,698 ft. (New field.)
Allen Parish: Shell Oil Co. 2 Moore, 19-5s-3w. Dry. TD 7,822 ft.
Assumption Parish: Phillips Petroleum Co. 1 Kittridge, 79-14s-14e. Junked. TD 11,025 ft.
Cameron Parish: Magnolia Petroleum Co. 54 Cameron Meadows, 28-14s-13w. IP 425 BOPD, 11/64-in., 42.4°, casing perforations 8,620-32 ft. TD 9,760 ft. (New pay in Cameron Meadows field.)
St. Bernard Parish: The Texas Co. 1 State Lease 2219, Township 15-17e, in Lake Anthanasio. Dry. TD 10,358 ft.
St. Landry Parish: Hassie Hunt trust 1 Deshotels, 20-6s-1e. Dry. TD 10,800 ft.
Terrebonne Parish: Sinclair Oil & Gas Co. 1 Terrebonne Parish School Board, 16-20s-14e (Lost Lake prospect). Dry. TD 14,000 ft.

NORTH LOUISIANA

Concordia Parish: Jett Drilling Co. 1 Learned, 48-2n-8e. IPF 138 BOPD, Wilcox 8,009-11 ft., 46°, 7/64-in. TD 9,012 ft. (Opens Black Hawk pool.)

OKLAHOMA

Carter County: Woodward & Co. 1 Lucas, SE SE 4-5s-3w. Dry. TD 7,186 ft.
Cleveland County: Calvert Drilling Co. 1 Foster, NE NE NE 14-10n-1e. Dry. TD 6,229 ft.
Comanche County: Paco Oil Co. 1 School Land, SW NW NW 36-1n-10w. Dry. TD 2,425 ft.
Cotton County: Clay Neal 1 Day, NW SW SE NE 23-5s-13w. Dry. TD 1,833 ft.
Grant County: Walter Duncan 1 Lusk, SW SE SE 4-28n-3w. Dry. TD 5,126 ft.
Greer County: Reinhardt & Donovan 1 Dugger, NW SW NW 5-7n-23w. Dry. TD 3,207 ft.
Harper County: Altus Drilling Co. et al 1 Lotspeich, C NE NE 13-29n-26w. Dry. TD 6,205 ft.
Lincoln County: Horace White 1 Sowards, SE SW SW 15-15n-6e. Dry. TD 4,240 ft.
Logan County: Jordan Petroleum-A&P 1 Chappell, NW NW SW 21-15n-1w. Dry. TD 6,122 ft.
Pawnee County: Mid-Continent Petroleum Corp. 1 Nimerick, SW SE NW 31-21n-5e. Dry. TD 3,929 ft.
Payne County: Hall-Jones & Jones Shelburne 1 Wetzel, NE NW NW 15-18n-1e. Dry. TD 5,191 ft.
Texas Crude Oil Co. 1 Yates, SW SE NW 7-18n-1w. Dry. TD 5,717 ft.
Pontotoc County: William H. Pine 1 Hamilton, SW SW NE 16-3n-8e. Dry. TD 1,557 ft.
Pottawatomie County: Newton Barrett and White Eagle Oil Co. 1 Stapp, NE NE SW 27-9n-2e. Dry. TD 6,036 ft.
Texas County: The Texas Co. 1 Flowers-Johnson-Eldridge, NE NE SW 23-1n-19eCM. IPF 259 BOPD, Morrow sand 6,825-55 ft., 41.5°, ½-in. TD 6,920 ft. (Oil discovery.)
Tillman County: Union Oil Co. of California 1 Emenhiser, NE NE NE 23-3s-17w. Dry. TD 5,828 ft.

KANSAS

Barber County: Sohio Petroleum Corp. and Musgrove 1 Angell, SE SE SE 11-33s-14w. Dry. TD 5321 ft.
Barton County: Schermerhorn Oil Co. 1 Stoskoph, NE SE NW 2-20s-14w. Dry. TD 3,585 ft.
Finney County: W. L. Hartman 1 Holsted-Thomason, SW SW SW 25-22s-33w. IPP 232 BOPD, Marmaton 4,442-58 ft., 30.7°. TD 4,905 ft. (Opens Finnup East pool).
Graham County: Jones, Shelburne & Farmer 1 Aust, SW SW NW 36-10s-22w. Dry. TD 4,000 ft.
Gray County: United Production Co. 1 Leese, C SE SW 34-27s-28w. Dry. TD 5,386 ft.
Kingman County: Stearns Petroleum 1 Tiesmeyer, SW SW NW 12-29s-9w. Dry. TD 4,696 ft.
McPherson County: Musgrove Petreleum 1 Miller, SW SW SW 19-19s-3w. TD 3,865 ft.
Morton County: Colorado Oil & Gas et al 1 Dryer "B," NE NE SW 5-32s-43w. IP 4,700 M.c.f. gas per day, Topeka 3,054-3,268 ft. TD 3,555 ft. (Opens Dryer pool).
Pawnee County: Greenland Drilling Co. 1 Hohner, SW SW NE 25-23s-15w. Dry. TD 4,138 ft.
Russell County: Durbin-Bond & Sterling 1 Redetzke, SE SE SW 32-15s-11w. Dry. TD 3,360 ft.
Stafford County: Natural Gas & Oil and Oklahoma Exploration 1 Suiter, SE NW SE 7-24s-14w. Dry. TD 4,265 ft.
Sumner County: Alpine Oil & Royalty Co. 1 Ramp, SW SW SW 1-35s-1e. IPP 334 BOPD, Miss. 3,505-15 ft., TD 3,515 ft. (Opens Bitter Creek pool).
Wichita County: Rooney Siegfried and Thomas 1 Smith, NW NW NE 22-20s-36w. Dry. TD 5,126 ft.

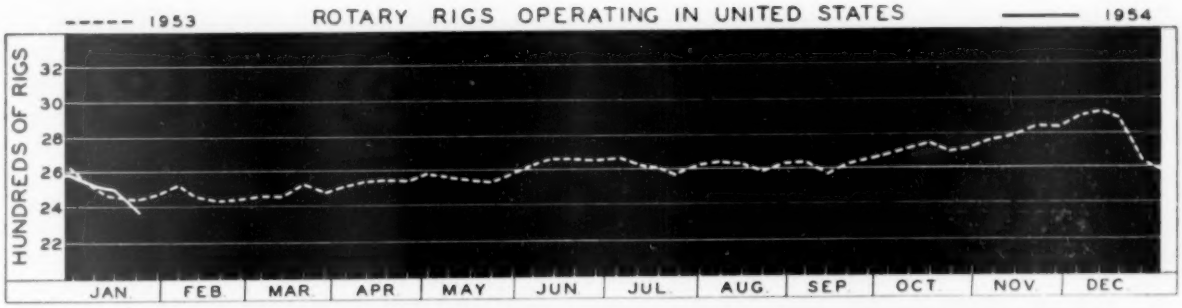
NEBRASKA

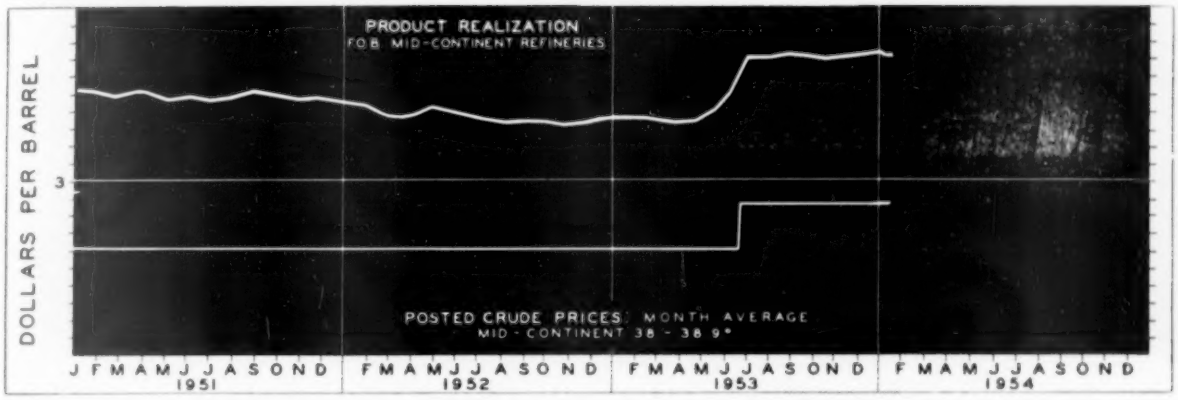
Cheyenne County: Jack Ladimer and S. D. Johnson 1 Badziong, NW NW NW 24-12n-50w. Dry. TD 4,850 ft. "J" sand 4,747 ft.
Kimball County, Northeast Long area: Eddie Fisher & Balderson-Denver Drilling 1 Harris, SW SE NW 11-12n-55w. IPF 20 BOPH, "J" sand discovery, new pay. "J" sand 6,223 ft. TD 6,272 ft.
Wytex Oil 1 Nelson, NW NW NW 29-16n-53w. Dry. TD 5,801 ft. "J" sand 5,746 ft.

CALIFORNIA

Fresno County: Fowler Drilling & Producing Co. 1 Lytle, 8-16s-18e. Dry. TD 7,515 ft.
Kern County: A. C. Fisher 1 Buena, 10-29s-22e. Dry. TD 3,414 ft.
Union Oil Co. 36-7 Hancock NE SW 7-30s-21e, IPF 2,060 M.c.f. gas, ½-in. choke, perfs. 1,326-1,420 ft., TD 2,155 ft. (New Phacoides sand, Pliocene, pool in Northwset Belgian Anticline area).
Kings County: Continental Oil Co. 1 Boston Land Co., 31-20s-19e. Dry. TD 3,888 ft.
Los Angeles County: Standard Oil Co. of California, Operator 15 Villa, 35-5n-17w. Dry. TD 6,500 ft.
Madera County: Tide Water Assoc. Oil Co.

(Continued on page 147)

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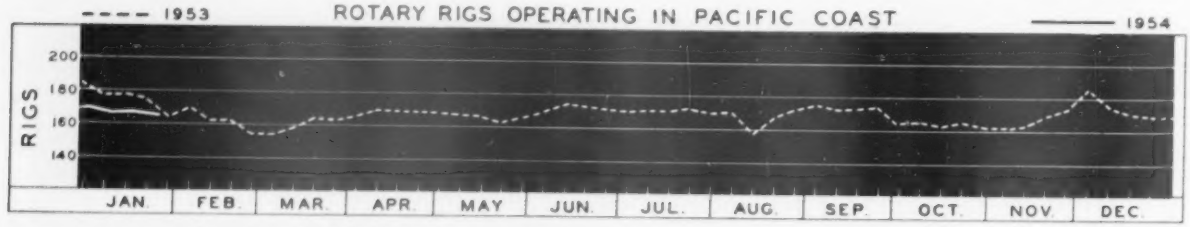
CURRENT STATISTICS

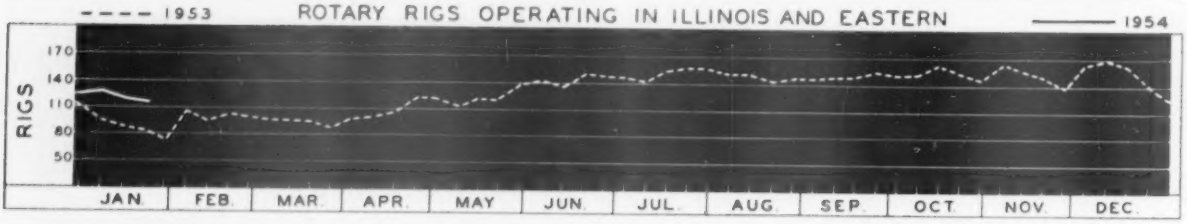
EXPLORATION

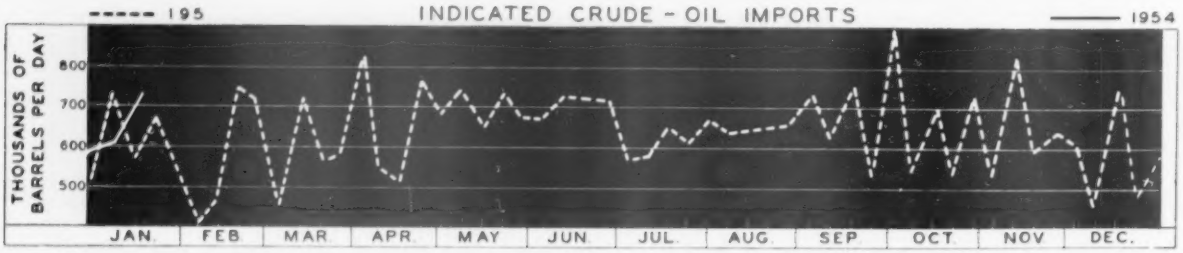
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 23, 1954

	Total of all wells					Jan. 23		Wildcat completions and discoveries					Cumulative total, 1954				
	Comp.	Oil	Gas	Dry	Footage	1954	1953	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Pennsylvania-New York	53	26	5	*22	108,928	174	150	0	0	0	0	0	0	0	1	2	3
West Virginia	17	1	9	7	49,542	34	29	0	0	1	1	2	0	0	2	2	4
Ohio	16	8	1	7	33,020	62	54	0	0	0	0	0	0	0	2	0	2
Indiana	15	3	0	12	20,087	52	125	0	0	0	9	9	0	0	0	13	13
Kentucky	22	13	0	9	37,938	64	87	0	0	0	3	3	0	0	0	7	7
Illinois	38	17	0	21	87,393	179	155	0	0	0	9	9	0	0	0	31	31
Michigan	14	4	0	10	25,216	47	44	0	0	0	6	6	1	0	1	21	23
Kansas	95	47	9	39	334,944	267	270	2	0	1	10	13	2	0	2	46	50
Nebraska	8	3	0	5	42,981	28	16	1	0	0	2	3	3	0	0	8	11
Oklahoma	182	107	8	67	591,846	562	378	1	0	0	15	16	7	0	0	47	54
Texas	380	207	13	160	1,743,322	1,044	899	16	2	5	108	131	43	5	10	262	320
N. Central (Dist. 7-B & 9)	149	87	0	62	510,924	391	292	12	0	0	42	54	28	0	0	107	135
West (Dist. 7-C & 8)	87	58	2	27	491,729	261	191	2	0	0	21	23	9	0	0	51	60
Panhandle (Dist. 10)	15	4	6	5	72,879	44	35	0	0	2	3	5	0	0	2	3	5
Eastern (Dist. 5 & 6)	17	7	0	10	88,180	43	39	0	0	0	5	5	0	0	1	11	12
Gulf Coast (Dist. 2 & 3)	52	23	2	27	325,835	169	157	1	1	1	15	18	4	3	4	47	58
Southwest (Dist. 1 & 4)	60	28	3	29	253,775	136	185	1	1	2	22	26	2	2	3	43	50
Louisiana	59	34	8	17	445,949	237	177	3	1	0	5	9	7	4	2	19	32
Northern	25	19	3	3	78,101	129	89	1	0	0	0	1	2	0	0	5	7
Southern	34	15	5	14	367,848	108	88	2	1	0	5	8	5	4	2	14	25
Arkansas	4	2	0	2	16,967	48	33	0	0	0	0	0	4	0	0	5	9
Mississippi	8	1	0	7	55,899	24	32	0	0	0	3	3	0	0	0	9	9
Southeastern States	4	1	0	3	21,002	9	7	0	0	0	3	3	0	0	0	7	7
Montana	1	0	0	1	7,412	21	30	0	0	0	1	1	0	0	0	7	7
Wyoming	54	45	3	6	278,726	102	38	2	0	0	3	5	4	0	0	15	19
Colorado	15	8	0	7	76,496	63	37	1	0	0	5	6	2	0	0	35	37
Utah	0	0	0	0	0	8	7	0	0	0	0	0	0	0	0	3	3
New Mexico	73	26	38	9	400,333	113	93	0	0	0	3	3	0	0	0	8	8
California	45	36	1	8	194,965	151	152	0	0	1	8	9	4	0	3	33	40
North Dakota	4	4	0	0	22,933	19	17	0	0	0	0	0	1	0	0	5	6
Miscellaneous	0	0	0	0	0	4	6	0	0	0	0	0	0	0	0	4	4
Total United States	1,107	593	95	419	4,595,899	3,312	2,836	26	3	8	194	231	78	9	23	589	699
Total previous week	1,029	527	64	438	4,329,899			24	3	8	211	246	52	6	15	395	468
Total January 24, 1953	916	451	54	411	3,712,311			30	2	3	190	225	94	8	19	600	721

Service wells included: *17, 12, 18.





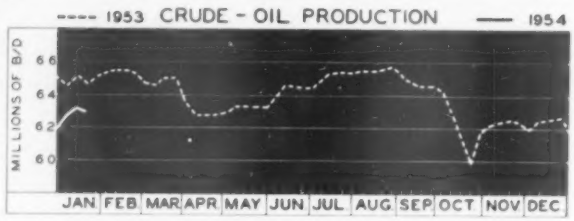


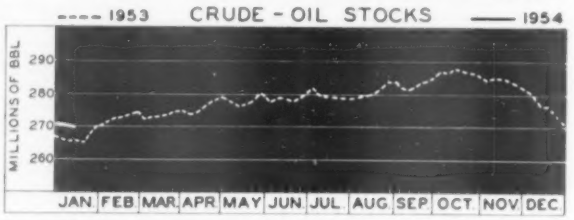
DAILY AVERAGE PRODUCTION FOR WEEK

	January 23			Jan. 16
	Crude oil	Lease condensate	Total	total
Alabama	4,500		4,500	4,300
Arkansas	75,000	550	75,550	76,400
California	1,007,700		1,007,700	1,008,500
Colorado	104,600		104,600	105,200
Eastern	58,900		58,900	59,000
Florida	1,475		1,475	1,475
Illinois	170,900		170,900	169,200
Indiana	31,500		31,500	32,700
Kansas	295,700		295,700	335,200
Kentucky	31,900		31,900	32,300
Louisiana	634,750	44,200	678,950	678,650
North	105,200	3,700	108,900	108,600
South	529,550	40,500	570,050	570,050
Michigan	33,600		33,600	33,400
Mississippi	89,550	3,500	93,050	93,300
Montana	34,400		34,400	35,100
Nebraska	18,700		18,700	18,900
New Mexico	198,825	900	199,725	199,625
Oklahoma	527,800		527,800	526,500
Texas	2,618,200	49,150	2,667,350	2,667,350
Dist. 1	39,500	450	39,950	39,950
Dist. 2	134,800	6,325	141,125	141,125
Dist. 3	417,300	23,750	441,050	441,050
Dist. 4	241,000	6,100	247,100	247,100
Dist. 5	44,900	450	45,350	45,350
Dist. 6	112,700	5,400	118,100	118,100
East Texas field	231,000		231,000	231,000
Dist. 7-B	121,400	50	121,450	121,450
Dist. 7-C	173,500	4,625	178,125	178,125
Dist. 8	839,000	1,500	840,500	840,500
Dist. 9	184,600	450	185,050	185,050
Dist. 10	78,500	50	78,550	78,550
Utah	4,700		4,700	4,700
Wyoming	238,700		238,700	239,800
North Dakota	14,600		14,600	14,100
Total U. S.	6,196,000	98,300	6,294,300	6,335,700
Change from previous week, down			41,400	
Canada	285,500		285,500	219,500

Total U. S. production January 1-23 144,820,750 bbl.
Same period last year (crude plus cond.) *150,624,650 bbl.

*Includes 2,032,900 bbl. condensate.



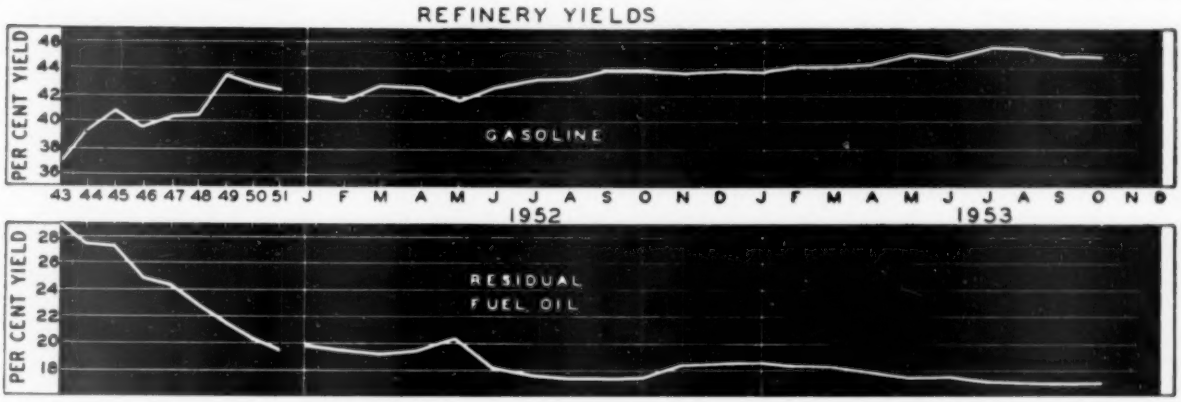


CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

	Jan. 16, '54	Jan. 9, '54	Jan. 17, '53
Pennsylvania Grade	2,532	2,521	2,282
Other Appalachian	1,688	1,713	2,005
Illinois, Indiana, Michigan	11,608	11,598	10,432
Arkansas	3,380	3,379	3,215
Louisiana	16,190	16,141	15,502
North	2,796	2,834	2,608
Gulf	13,394	13,307	12,894
Mississippi	3,145	3,471	3,291
New Mexico	8,959	9,276	7,069
Oklahoma and Kansas	35,253	34,624	35,496
Texas	125,454	127,343	133,773
East Texas	11,766	11,228	11,530
West Texas	53,800	54,884	61,792
Texas Gulf	26,179	26,281	26,249
Other Texas	33,709	34,950	34,202
Rocky Mountain	16,633	16,601	14,290
California	34,020	33,488	32,234
Foreign	†10,714	10,423	7,924
Total	269,576	270,578	267,513

*Bureau of Mines. †Includes 2,947,000 bbl. in California


REFINERY YIELDS
PER CENT YIELD
GASOLINE
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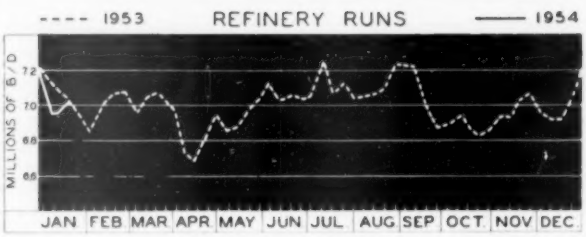
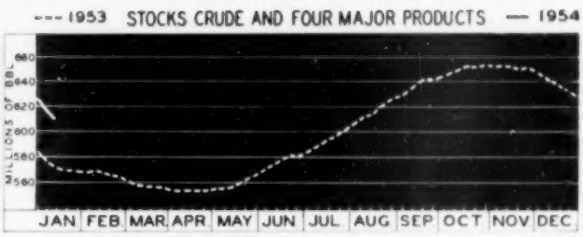
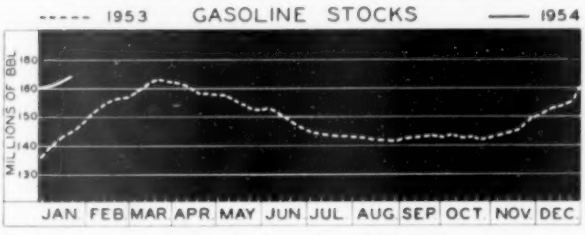
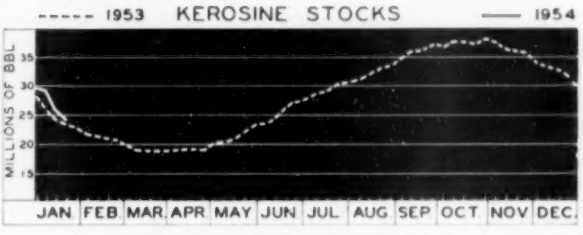
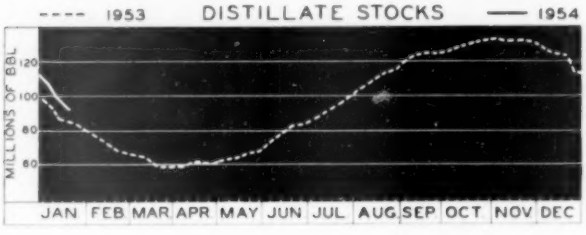
1952
1953
PER CENT YIELD
RESIDUAL FUEL OIL

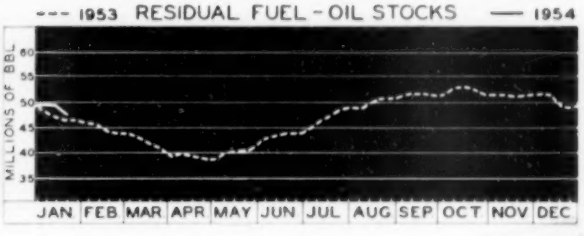










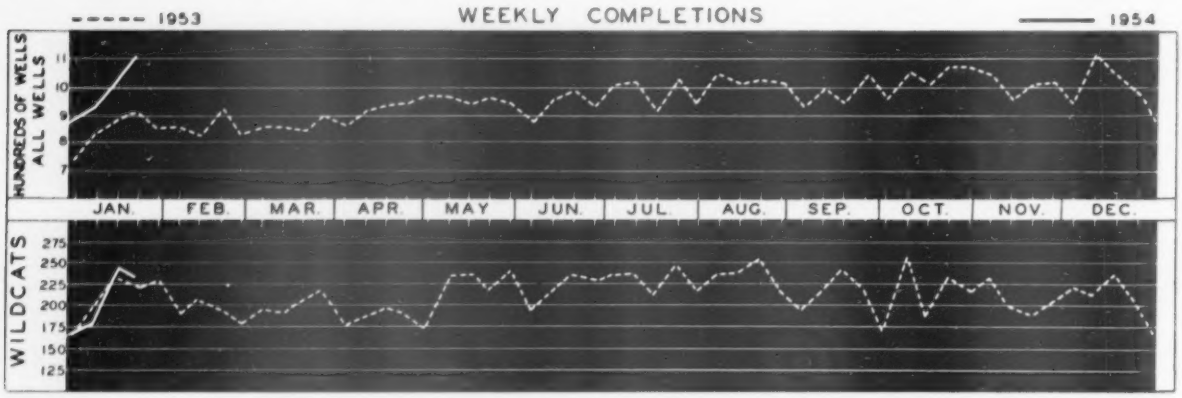


A.P.I. REFINERY REPORT, JANUARY 23

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, January 1953—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid
East Coast	1,019	410.3	34.4	258.8	204.8	34,919	10,435	32,957	10,065	1,080	452.9	48.5	259.9	260.9
Appalachian:														
District 1	114	47.6	9.4	25.7	12.9	4,295	546	1,293	742	116	48.9	9.3	19.6	19.2
District 2	96	42.8	5.7	15.9	15.0	2,061	504	575	184	92	47.6	7.9	14.3	16.1
Ind., Ill., Ky.	1,316	686.6	81.3	230.1	175.9	34,750	5,908	14,686	4,186	1,324	689.6	104.0	246.0	194.9
Okla., Kans., Mo.	557	344.7	16.3	142.7	43.6	18,520	1,356	8,766	1,044	582	330.9	12.6	141.1	62.4
Inland Texas	236	181.7	13.4	32.4	27.4	6,612	294	1,597	1,319	273	184.4	15.5	41.3	39.4
Texas Gulf Coast	1,694	822.1	143.9	409.7	241.0	24,134	2,598	10,718	6,218	1,742	790.3	155.7	441.4	253.0
La. Gulf Coast	554	279.3	73.7	147.3	37.9	10,349	1,274	4,982	1,199	524	239.5	56.3	130.4	50.9
N. La. and Ark.	91	39.3	8.3	23.3	6.7	3,935	543	814	129	86	35.5	8.5	18.3	8.1
Rocky Mountain:														
New Mexico	19	12.6		2.9	2.7	215		61	40	20	12.1	0.7	2.6	4.0
Other Rocky Mtn.	234	114.6	3.7	52.0	40.4	6,655	188	2,221	799	229	117.2	7.1	47.4	43.4
California	1,088	481.4	3.2	168.3	376.8	21,336	388	12,731	21,322	974	435.0	7.2	166.1	354.6
Jan. 23, 1954	7,018	3,463.0	393.3	1,509.1	1,185.1	167,781	24,034	91,401	47,247	7,042	3,383.9	433.3	1,528.4	1,306.9
Jan. 16, 1954	6,968	3,451.9	405.1	1,474.7	1,274.7	165,551	25,873	99,675	49,066					
Jan. 24, 1953	7,031	3,307.7	393.7	1,588.7	1,253.0	145,879	23,890	85,179	46,918					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.73 for week ended January 16, $3.73 for previous week, and $3.36 for January 1953. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 27, 1954. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.75-11.25	12.5-13.5	10.75-11.75
Premium gasoline	11.75-12.25	13.75-14.5	11.75-12.75
42-44 w.w. kerosine	9-9.25	10.7-11	9.25-9.5
No. 2 straw fuel oil	8.125-8.375	9.7-10	8.5-8.75
No. 6 residual	$1.50-1.60	$2.25-2.40	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.125	4.625	4.875
Grade 18-55	6.15	5.65	5.90

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12.5-13.75
750 vis., No. 3-4 neutral	15.5-16.75
2,000 vis., No. 5-6 neutral	17-18.75

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	19
200 vis., No. 3 neutral, 0-10 pp.	14.25

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5
180 vis., 10 p.t. neutral	22.5

WAX
Mid-Continent

132-134 A.M.P.	6.0

COLDER weather brought another price increase for burning oils both on the East Coast and at Gulf Coast ports. Further additions to gasoline inventories increased the pressure on posted gasoline prices. Natural gasoline was hit by the first seasonal price cut, but the reduction was from a lower winter price than a year ago.

Socony-Vacuum Oil Co., Inc., announced increases in prices of kerosine, No. 2, and other distillate fuels, effective January 23. The increase for the New York Harbor area was 0.3 cent a gallon, but the average for the marketing area averaged less than 0.3 cent. Most of the other major suppliers had met the increase by the middle of the week, but some material was reported to be available at 9.7 cents for barge deliveries of No. 2 as late as Wednesday. The top price of 10 cents a gallon for No. 2 compares with a top of 9.65 cents a year ago, and since that time crude prices have gone up 25 cents a barrel or 0.6 cent a gallon.

Kerosine and distillate prices moved up on the Gulf Coast in response to the return to normal demand in the East.

Gasoline continued weak on both inland and coastal markets. In the Mid-Continent area, some suppliers faced with demurrage charges on gasoline in pipe-line terminals, have been offering material at distress prices. Some of these suppliers have a formal posting of 11 cents a gallon for the low of regular on the Group 3 market, but enough material is moving at 0.25 to 0.5 cent under this price to set an average low at about 10.75 cents. Some marketers expect slightly better prices after the end of the month.

Natural gasoline dropped 0.375 cent a gallon on January 25, bringing the Group 3 price for Grade 26-70 down to 5.125 cents a gallon. Since October 21, the price has been 5.5 cents, the same as the low after the seasonal cuts a year ago.

CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective January 1, 1954.

FLAT CRUDE PRICES

Representative posted schedules per barrel

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.76
Middle District	3.70
Southwest Pennsylvania	3.31
West Virginia	3.25
Ohio	3.24
Illinois Basin	3.02

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WANTED: Several party chiefs — transit men with pipe line location experience. Also one Engineer graduate to head up organization for field surveys. Age 30 to 45. Write Box G-885, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT gas producer needs experienced production superintendent familiar with drilling, completions and producing operations in East Texas and North Louisiana. Replies confidential. Box G-891, The Oil and Gas Journal, Tulsa, Oklahoma.

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Must have 5 years' Executive Geological Background and extensive Lease Trading experience.

SALARY: to $20,000

This position is with a well established Independent Oil Company.

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616 S. Main Tulsa, Oklahoma

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SOUTH AMERICA

A major oil company affiliated with Standard Oil Company (N. J.) needs graduate engineers with several years' refinery process equipment inspection experience. Must be qualified to interpret codes and specifications, predict equipment renewals, and recommend replacement equipment.

Write giving age, marital status, education, and full details of experience.

Box 308-O
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New York 19, N. Y.

WANTED

GAS or PETROLEUM ENGINEER

with experience in the installation and operation of gasoline absorption plants, compression stations and oil refineries. Reply in confidence.

Box G-909, The Oil and Gas Journal, Tulsa, Oklahoma

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co. Box 2603, Tulsa, Okla. $5.00 cash.

MANUFACTURER'S AGENT to represent manufacturer of oil field drilling equipment in the North Texas and Panhandle area. Box G-882, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Person experienced in the development, improvement and evaluation of petroleum products (not petrochemicals). Southwestern location, small community, integrated oil company of moderate size. Opportunity for advancement and supervisory experience. Box G-888, The Oil and Gas Journal, Tulsa, Oklahoma.

CHIEF CHEMIST experienced in Pod column work and gasoline plant process and product control testing to take charge of laboratory located at large gasoline plant in West Texas. Housing furnished and salary to be commensurate with qualifications of applicant. Please furnish experience record and salary expected. Our employees have been notified of this advertisement. Box G-776, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Manufacturers representative for Chemical Company for State of Texas. Chemical or engineering background and oil field following important. Give details and background first letter. Box G-912, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL FIELD PIPE SALESMAN

Excellent opportunity for young man, thoroughly experienced, capable of administering and handling new and second-hand oil field tubular products. Location eastern Colorado. State qualifications and salary desired. All correspondence strictly confidential. Reply Box G-901, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

Engineers with petroleum refinery operating experience. Several positions open to qualified engineers for field service duties in new refinery set-up and operations. Applicants must be willing to travel. All applications strictly confidential. Please send complete resume giving age, education, experience and salary desired to

Box G-848

The Oil and Gas Journal Tulsa, Oklahoma

HELP WANTED

GEOLOGIST: Active Independent Producing Company has opening for Geologist — prefer graduate of Southwestern school — 5 to 10 years' experience — subsurface — well sitting — age, 30-40 — live in Tulsa — operate in central and eastern Oklahoma. All replies strictly confidential. Box G-883, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT MAN NEEDED: Oklahoma refinery has opening for experienced instrument man. Must be able to install and service usual makes and types of refinery recorders and controllers. Normal 40 hour week with extra pay for call outs and overtime. Write giving resume of education, training, and experience. Replies will be held confidential. Box G-884, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS

Foreign service. Graduate Chemical, Mechanical, Electrical & Construction Engineers with minimum 5 years' experience. For specialized assignments commensurate with qualifications in various phases of construction, estimating materials and cost control, planning and refinery process work. Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR, BOX OG-3

Arabian American Oil Company
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New York 22, N. Y.

OIL REFINERY MAINTENANCE ENGINEER

THE MAN WE WISH TO EMPLOY IS PROBABLY EMPLOYED BY SOME OIL COMPANY

He should be a graduate engineer and trained to supervise oil refinery shut downs, particularly catalytic cracking units. He must have the personality and ability to cope with labor relation problems and negotiations, and enjoy sales contact work with clients and prospective clients. We are only interested in interviewing men that make excellent presentations and have poise in all of the categories mentioned above. We will train the man chosen to our methods, and the position can lead to one of chief engineer or a managership. All replies will be held in strict confidence. We are contractors headquartered in California to the petroleum and chemical industries engaged on operations domestic and foreign. Salary commensurate with experience and ability. Kindly forward educational and business background information with photograph to

Box G-892, The Oil and Gas Journal Tulsa, Oklahoma

HELP WANTED

SIDELINE SALESMAN WANTED or Manufacturers representative calling on the oil industry and supply houses to represent large manufacturer of Wiping Rags and Cotton and Wool Waste. We offer a marvelous opportunity to the right man with a following. Must have good following. Top commission paid. State what territory you now cover. Exclusive territorial rights can be arranged. This is a high quality competitive line. Nationally known brand. Give full information first letter. Columbia Wiping Cloth Co., 10th and Hardesty, Kansas City, Mo.

PROCESS ENGINEER: Young man, under 35, with Degree in Chemical Engineering or Petroleum Engineering (Refinery). Up to 3 years experience in oil refinery process work desirable but not absolutely necessary. Permanent position with a Texas Gulf Coast refinery. Please give complete personal resume. Box G-881, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGER for oil well equipment business, having engineering education, 10 to 15 years' experience in sales and supervisory capacities and having major oil company contacts. Age 35-45. Substantial salary and commission. Submit detailed resume of qualifications to Box G-910, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM OR RESERVOIR ENGINEER

For New York office of major for eign producer. Proficient in mathe matics with 4 or more years' exten sive experience in oil and gas res ervoir engineering on primary and secondary recovery problems. Duties will include preparations of basic field production and reservoir data for application in analogue and dig ital computors, performance of an alytical analysis of field behavior and interpretation and preparation of resulting data for reservoir en gineering reports on specific fields.

Write giving full particulars regard ing personal history and work ex perience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OG-1
Arabian American Oil Company
505 Park Avenue
New York 22, N. Y.

PETROLEUM ENGINEERS

(Age 21-30, preferably single)

Desired by major oil company for career opportunities in South America.

Work in various phases of aggressive drilling and production programs. Good opportunity for advancement. Minimum requirements: Degree in engineering from accredited institution, 0-10 years' experience in petroleum engineering field. Salary plus bonus: $6700-11,000. Also liberal benefits, tax savings and home vacations with traveling expenses. Replies confidential.

Box 1540
Department M
General Post Office
New York 1, New York

HELP WANTED

SALES ENGINEER: Chemical company offers excellent opportunity in refinery division of oil industry for Chemical or Mechanical Engineer. Age 25-30. Prefer single man. Extensive travel required. Salary, expenses and automobile furnished. Give age, experience, education, etc. in first letter. Box G-908, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE GEOLOGIST wanted by young Oil Company. Attractive salary together with overriding royalty. Kansas City, Oklahoma, Texas location. Transportation and expenses furnished for interview. All inquiries answered by March 1, 1954. Direct personnel abstract to Box G-905, The Oil and Gas Journal, Tulsa 1, Oklahoma.

OIL COMPANY client of ours has foreign jobs coming up in 1954 for men experienced in oil production, Middle East. Single Status. Write: Oil Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla.

DIVISION GEOLOGIST

Wanted at New Orleans experienced aggressive geologist familiar with Gulf Coast. An exceptional man age range 35-45 desired. Salary open. Please furnish full particulars education and experience.

Box G-913
The Oil and Gas Journal
Tulsa, Oklahoma

WANTED TECHNICAL WRITER

Man or woman, college graduate, with background of chemistry or chemical engineering to assist in preparing articles and abstracts. Will work closely with outstanding petroleum chemist in Midwest. Liberal employee benefits. All applications strictly confidential. Please send complete resume giving age, education, experience, and salary desired to:

Personal Director
UNIVERSAL OIL PRODUCTS COMPANY
30 Algonquin Road
Des Plaines, Illinois

SITUATIONS WANTED

GEOPHYSICIST, desires position as Seismic Supervisor. Thirteen years experience. Education in electronics and geology. Particularly interested in record reinterpretation. Box G-833, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: married, 33, law degree, employed with oil company, 3 years' experience, scout to district landman, performing supervisory work on leasing, titles; handling farmouts, joint ventures, well deals. Desire change. Box G-902, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, seven years' experience, wishes affiliation with independent contemplating entry into, or already interested in the Rocky Mountain Area. Box G-896, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE PILOT, Degree Geology, current CAA Airline Transport Rating twin Beechcraft and Douglas DC3, 4500 hours. Commercial rating single and multiengine land and sea. Release from Navy January. Desire flying position connection oil operations independent or company. Box G-878, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

CHEMICAL ENGINEER, age 40, fifteen years' experience in the operation and design of Gasoline Plants, Refineries and Petro-Chemical Plants, specialized in the design and operation of high purity ethylene plants. Desires responsible position with a progressive Oil Company. Box G-791, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE ACCOUNTANT: 12 years' experience, oil producing and pipe line. 8 years contracting and manufacturing. Desires position with aggressive company. Box G-893, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER, 30, desires to relocate. Broad experience with major company. Background includes process engineering and operating, refinery economics, crude and product quality studies, refinery efficiency surveys. Box G-898, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT: BBA, age 30, married, 5 years' heavy industrial and oil and gas experience. 3 years as supervisor. Desires job with operator or small company. Box G-904, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 28, 3 years' experience, mostly in secondary recovery in Kansas and Oklahoma. Box G-903, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND MAN: 25 years' experience in all phases of land work in Mid-Continent, Gulf Coast and Rocky Mountain Areas, with major and independent companies. Good references. Available now. Box G-866, The Oil and Gas Journal, Tulsa, Oklahoma.

TELEPHONE OUTSIDE PLANT ENGINEER. Thirteen years' Bell System service. Consider overseas. Box G-900, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER and Attorney; B.S. degree and Member Texas Bar; 7 years Oil Industry practically all phases. Box G-911, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION ENGINEER: 15 years experience, 5 in secondary recovery. Age 37, married. Interested in both good salary and opportunity. W. L. Stubblefield, 1612 East 12th, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 1628, Ph. No. 3-3141, Hobbs, New Mexico.

PILOT and Petroleum Engineer — Desire combination job in Petroleum Industry. Age 29, licensed commercial Pilot. Employed as Petroleum Engineer with major oil company, 19 months' experience. Box G-873, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST, 33, M.S., 8 years' experience in all phases of exploration and development, exceptional discovery record, presently serving as district geologist for major company in West Texas and New Mexico, desires responsible position in West Texas or Rocky Mountain area. Box G-894, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, six years' varied experience, three years field engineer. Presently employed with major in South Louisiana. Desire aggressive independent or individual. Must offer responsibility and opportunity. Box G-886, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 20 years' experience, 8 years Rocky Mountains. Presently head Geological Department independent oil company in Denver. Thoroughly experienced in execution and direction of all exploration work; drilling; leasing fee, state and federal lands; making farm-out deals. Legitimate reason for making change. Available March 1st. Replies confidential. Box G-868, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION ENGINEER or production foreman with 8 years' foreign experience and 18 years in the States. Wide experience in well completions, workovers, gas lift, strata frac and all secondary recovery. On foreign service handled all phases as supervisor, such as office management, transportation, public relations, personnel, as well as items listed above. Will consider domestic or foreign service. Box G-906, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

JOY 250, tandem trailer mounted with tools and drill pipe, located Tulsa, A-1 condition. Inquiries to Box 6147, Tulsa, Okla.

SHRIVER 42" x 42" cast iron Filter Presses, Plate & Frame Type; 15—Sperry 18" x 18" cast iron Filter Presses, 11 chambers; #12 Sweetland Filters. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 150 Observer Highway, Hoboken, N. J. N.Y. Tel. BArclay 7-0600.

FOR SALE: 5½" x 20" class 'Y' Cooper Cylinders, 11" x 16" Superior Cylinders, 8" x 10" XOB Cylinder, Electric Driven Centrifugal Pumps, 125 KW Generator, 4"—500 lbs. rising stem gate valves. Alfred B. Kern, 223 Wright Bldg., Tulsa 3, Oklahoma.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

KIOWA DRILLING COMPANY YARD at Great Bend, Kansas, with approximately 3 acres of ground 100 x 40 Quonset building, offices modern, one story duplex dwelling, tool shed and tool buildings, three sided truck garage, timber tool dock, welded casing racks, 8 foot wire mesh fenced, shade trees. Highway location. For complete description write or call

SOL M. BRACK AGENCY
American State Bank Building
Great Bend, Kansas

AVAILABLE NOW!

FOUR 20" x 14" PISTON OPERATED
LOW PRESSURE
SURGE STABILIZER VALVES

Mfr.: Forsyth Engineering Co., Houston, Texas

Piston: Operates at differential pressures of 30 to 100 PSI depending on pilot spring setting. Valve passes 10,000 GPM at not more than 25 PSI pressure drop.

Fluid: Crude Oil.

Body Material: Cast Steel.

Trim: Stainless Steel.

Inlet Flange: To match 20-inch, 400# ASA octagonal ring joint, bottom inlet.

Outlet Flange: 14-inch, 400# ASA octagonal ring joint, side outlet.

Operating & Test Pressure:
Maximum Working Pressure—550 PSI.
Hydrostatic Test Pressure—825 PSI.

NEW—NEVER INSTALLED OR USED

Manufactured cost more than $10,000 each. Location: Houston, Texas. Convertible for other applications.

We will consider an offer for any or all of these valves at a very substantial discount from original cost. Detail drawing upon request.

J. C. BERKWIT & CO.
(OWNER)
551 Fifth Avenue, New York 17, N. Y.
Phone: MU 2-2214 Cable: "BERKWITCO"

EQUIPMENT FOR SALE

FOR SALE: 2000 ft. 3½" bottle neck drill pipe, very good condition. $1.25 per ft. 1 set of 3½ to 5" tongs, $350.00. 1 4000 ft. brier swivel, $400.00. 1 GAK Waukesha 165 hp. mtr. with starting motor, $1650.00. Or will trade for casing or 2" upset tubing of equal value. F. H. Graves, P. O. Box 583, Phone 4726, Ardmore, Oklahoma.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: 6000' 3½" seamless line pipe P.E. 35 to 40' random lengths. Clean inside and out. Beveled. 25c. M. J. Regan, Coffeyville, Kans.

NEW 12¾ SEAMLESS COUPLINGS $5.50 each. Edco Pipe & Supply, Box 151, Tulsa, or phone 4-5970.

250,000 FT. 8⅝ o.d. pipe with collar and plain end. $1.00 per foot Oklahoma. Rogers & Lindquist, 620 Wright Building, Tulsa, Okla. Phone 3-2072—5-8850.

USED EXCELLENT CONDITION
IN OPERATION

One Each (4¾" to 1") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

OILFIELD SALVAGE CO., INC.
Phone CHarter 6914
P. O. Box 2589 Houston

FOR SALE

Several mud logging trailers completely equipped, sleeping quarters, gas detectors, mud analysis equipment, ultra-violet oil detectors, intercom systems, mud analysis, equipment, microscope, two way radio equipment. Price range $3500 to $6000 payment on delivery. West Texas inspection site. Will deliver to purchaser. **Box G-890, The Oil and Gas Journal, Tulsa, Oklahoma.**

FOR SALE

Two model O-7 Murry and Tregurtha Harbormaster outboard propulsion units with twin 6-71 GM diesel engines. Each unit rated 330 HP. Designed for remote control starting, stopping and steering. Complete with barge mounting plates. Price reduced.

Four ZP Viking rotary pumps equipped with 36" 10 groove "D" section sheaves, together with three 75 HP 220/440 volt, 1175 rpm electric motors with sheaves and belts for driving pumps. Pump capacity 1050 gpm, 50 psi.

Four 8GR Worthington rotary pumps, capacity 1000 gpm at 200 psi, skid-mounted with sheaves and V-belts. Also four 6GR Worthington pumps, capacity 700 gpm at 200 psi. Two 5GR Worthington pumps, capacity 400 gpm at 200 psi. Ten 4GR Worthington pumps, capacity 200 gpm at 200 psi.

Six 3ugl and 4ugl Worthington centrifugal pumps mounted on steel base, capacity 1100 gpm at 300 psi.

One 10" x 18" Gaso piston pump mounted on skids, capacity 700 gpm at 125 psi.

SOHIO PETROLEUM COMPANY
407 N. 8th Street, St. Louis 1, Missouri
Attention: H. F. Fisher

EQUIPMENT FOR SALE

SULLIVAN 200, tandem trailer mounted with tools and drill pipe, A-1 Condition, ready to go. Inquiries and inventory to Box 6147, Tulsa, Okla.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

USED WILSON "Titan" Drawworks with Type DR 40" Hydromatic Brake, Foster Catheads, Compound for three LRO Waukesha Engines; 4" x 50' Chiksan Rotary Hose, 3½" and 4½" IJ Drill Pipe; plus other accessories priced to sell. Jones & Laughlin Steel Corporation, Supply Division, Box 2481, Attention W. R. Clarke, Tulsa, Oklahoma.

40 ea. Cable Tool Stems—4" to 5½" O.D. 20 ea. 5½" x 36" Fishing Jars W. 3¾" Joints. 95 ea. Bailers—4¼" to 10" O.D.—25' to 70' Lengths. 84 Sand Pumps—Spang—Larkin—Miller—All Sizes. Well Servicing Units—All Sizes—Truck Mounted or Skid Units. RL Cardwell Double Drum Spudder—Excellent Condition. General Tool & Supply Co., Box 4387, Oklahoma City, Oklahoma.

REDA PUMP complete w #4—20 Motor 45¼ H.P., 650 Volt, 41.6 Amps. #50—Pump Housing, #5595—Switchboard w/recording Ammeter 3400'—#4 Cable 125 Amp. Auto Transformer Accessories. Engine 225 H.P. Climax Type R-225 on Skid. Alternator G. E. 125—KVA, 100 KW, 440 V. A. C. w/Transformer, Flexible coupling and skid base. House—10' x 18' wood frame, w/G.I. Roof and Siding on Skid. Engine—165 Hp. Climax R-61 on Skid. Herndon Drilling Co., 421 Mayo Bldg., Tulsa, Phone 4-9700.

FOR SALE: SPEED STAR SPUDDERS. No. 83 Semi Trailer Star Spudder with goose neck bracket for transportation, $9,000.00. No. 71-A Speed Star for truck mounting, $3,500.00. Both machines in good running condition. Available immediately f.o.b. New Mexico. Can furnish used tools and lines with either machine if desired at additional price. Jackson-Markus Supply Co., 3612 E. 26th St., Los Angeles 23, California. Cable & Rotary Equipment—Bought—Sold—Rented.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy, We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED — GOULDS PUMP, industrial horizontal high pressure piston type. In serviceable condition. Hato Schroeder, Route 2, Box 30, Canton, Kansas.

AIR DELIVERY

FAST TRANSPORTATION of emergency parts, freight and passengers anywhere in the U.S.A. Licensed air taxi operator. Custom Air Service 3719 Lincoln Ave., Chicago, Ill. Phone WEllington 5-1874. Week ends and nights, GReenleaf 5-4642.

BUSINESS OPPORTUNITIES

WOULD LIKE TO INVEST large sum of cash and time with substantial supply, tool or service company wishing to expand and desiring the services of experienced man under 40, college educated, and quite a lot of cash. This is a real opportunity for a solid large company wishing to open a new division office but needing the right man and hoping he has money. Box G-889, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL CONTRACTORS

Office Phone 5-5315 **Res. Phone 7-4950**

W. L. RATCLIFF COMPANY
ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution

W. L. Ratcliff **506 Caddo St.**
P. O. Box 373 **Shreveport, La.**

EIGHTY-THOUSAND BBL. FLOATING ROOF TANK

Chicago Bridge make A.P.I. all welded 5 rings 120' x 40' located Illinois, sell where is or cutdown reerect any place.

Phone 3-6141 **W. C. BERRY** **P.O. 1858, Tulsa**

ROYALTIES

FREE TAX INFORMATION for those desiring to sell their producing royalties overrides or production. Robert L. Kinkaid Box 26, Tulsa, Oklahoma.

I OFFER Non-Production Royalties large blocks in West Texas. Write for full details P. O. Box 1242, Columbus, Ohio.

LEASE AND DRILLING BLOCKS

CHEAP LEASES & ROYALTIES AVAILABLE: Due to other interests will sell my unproven acres to highest bidders. Wyoming—18,000 acres—leases. North Dakota—2,000 acres—leases. Colorado—480 acres—leases. North Dakota—800 acres—minerals. Write for list. Box G-887, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW MEXICO STATE LEASE, will sell 4,000 acre solid block semi-wildcat, good location. Box G-907, The Oil and Gas Journal, Tulsa, Oklahoma.

160 OIL LEASE Farnam Dome, Utah, near new gas well. Bargain. R. O. Barnsley, 950 Lincoln Ave. Palo Alto, California.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

PUT YOUR MONEY to work. See A. L. Bowles, Ada, Okla., for Oil Investments & Drilling deals. Quick Action.

CALIFORNIA lease blocks: 17,000 acres Northwest Coalinga; 1,000 acres West Newhall. CECIL BLINN, 2911 Hermosita Drive, Glendale, California. Phone Citrus 3-2088.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo

REAL ESTATE

80,000 ACRES: Mineral timber land, Tennessee—$3.50 per acre, all mineral rights. Details—E. Jester, 12744 Vanowen, North Hollywood, California.

"APARTMENT HOUSE"
THE FINEST IN LONG BEACH, CALIF.
16 fine large, near new, units, overlooking the blue Pacific Ocean on the finest street. 10 garages. Tenants pay own utilities. Permanent rentals, no vacancies. Income $24,000.00 per year. Asking price $215,000.00, some terms. Write, wire, phone, owner Carl Whitson, 3617 E. Ocean Blvd., Long Beach, Calif.

BUSINESS OPPORTUNITIES

CASH AVAILABLE
For Purchase of Producing Oil & Gas Properties

Principals require attractive investment opportunities. Complete information necessary.

Box G-854
The Oil and Gas Journal
Tulsa, Oklahoma

EQUIPMENT MEN

Edlund Made Butler's General Sales Manager

H. A. EDLUND

Harold A. Edlund has been promoted to the post of general sales manager of Butler Manufacturing Co., Kansas City, it has been announced by Glen C. Speakman, vice president in charge of sales.

Edlund joined Butler in May 1952, and has been assistant general sales manager. A graduate of University of Pennsylvania's Wharton School, Edlund has served in various sales-manager positions. After the war, Edlund became associated with General Aniline & Film Co. as western sales manager, and later took over the direction of national sales for Arco Co.

In his new position at Butler, Edlund will direct sales efforts of all the Butler product divisions, oil equipment, steel buildings, and special products, and the sales subsidiary companies, Butler Pan-America and Butler International Co.

Northern Natural Installs Six Gas Turbines

Six gas turbines have been installed in natural-gas pipe-line compressor stations of Northern Natural Gas Co. at Tescott and Macksville, Kans., according to an announcement by John P. Keller, general manager of the General Electric Co.'s gas-turbine department. Four of the units are in operation, while the remaining two will be placed on the line in the near future. The new installations bring the number of gas turbines now being used for pumping natural gas to 38.

Manufacture of the units for Northern Natural Gas was one of the fastest production feats in the 3-year history of commercial manufacture of gas turbines by G-E, Keller said.

Northern Natural Gas Co. had applied to the Federal Power Commission for authorization to enlarge pipeline facilities to bring natural gas from Texas and New Mexico to midwestern industrial areas. When approval was obtained, and the order placed on May 8, 1953, the company requested that the gas turbines be installed in time for the winter heavy load season of 1953-1954. The first three units were actually shipped in September, only 18 weeks after receipt of a firm order.

Pacific Pumps Announces Executive Advancements

E. J. Weis, vice president and director of sales, of Pacific Pumps, Inc., Huntington Park, Calif., has announced four appointments within that organization. A. F. Canada, Jr., formerly Mid-Continent regional manager for the centrifugal pump division, has been appointed sales manager of that division. He has been associated with Pacific Pumps since 1945.

A. F. CANADA

G. F. GRAHAM

W. J. BAHLER

McCORMICK

G. F. Graham, formerly assistant sales manager of the plunger pump division, has been appointed sales manager of that division. A veteran of more than 30 years in oil well pumping equipment, he joined Pacific pumps in 1933.

Walter J. Bahler, widely known in Tulsa area for his experience in the sales engineering of machinery, has been appointed manager of Pacific's Tulsa office, centrifugal pump division.

J. W. McCormick, a Pacific sales engineer in California and New York for the past 12 years, has been advanced to assistant manager of the firm's centrifugal pump office in New York.

Allison Division's West Coast Office Established

A West Coast sales office has been established by Allison Division of General Motors Corp., it has been announced by H. N. Roberts, assistant sales manager of the transmissions operations at Allison.

The new office, located at Berkeley, Calif., will deal with the sales of torqmatic converters and transmissions for the oil field, off-highway truck, and excavator industries.

W. C. Edwards has assumed charge of the new office and will be known as West Coast sales engineer. F. S. Strain has been appointed West Coast service representative and will also be located in Berkeley.

Edwards, formerly in charge of the eastern territory, came to Allison in 1949, as a senior clerk, and was appointed sales engineer in 1953.

Strain came to Allison in 1951, as service representative trainee, and was appointed service representative the same year.

WILDCAT COMPLETIONS

(Continued from page 138)

1-19 Redman-Stone, 19-10s-14e. Dry. TD 2,955 ft.

Orange County: The Texas Co. 1 Hodges, 7-4s-9w. Dry. TD 7,075 ft.

San Luis Obispo County: Steele Petroleum Corp. 1 Steele Pet.-Cuyama, 10-10n-27w. Dry. Cretaceous 5,152 ft., TD 5,200 ft

Santa Barbara County: Signal Oil & Gas Co. 1 Signal-Dos Pueblos, 1-4n-30w. Dry. TD 3,201 ft.

MONTANA

Rosebud County, Northwest Sumatra area: The Texas Co. 2 State "B," NE NW 36-11n-33e. Dry. TD 7,412 ft. Cambrian 7,404 ft.

WYOMING

Big Horn County, E. Lamb: Forest Oil Corp. 10-3 Government, SE NE NW 10-51n-92w. Dry. Phosphoria 3,847 ft. TD 3,953 ft.

Fremont County, Beaver Creek: Stanolind Oil & Gas Co. 30-M, S½ NW NE 10-33n-96w. IP: flowed 341 BOPD 7/64-in. choke. Madison 11,189 ft. TD 11,447 ft.

Hawkins Draw: Quintana Producing Co. 1 Unit, C SE SE 18-35n-92w. Dry. TD 8,960 ft. Upper Shannon 8,594 ft.

Niobrara County: Cosden Petroleum Corp.-R. L. Manning-Wind River Oil 1-A Government, C NW SW 3-40n-66w. IPF 350 BOPD, Newcastle discovery (new field). Newcastle 7,741-50 ft. TD 7,926 ft.

Weston County, S. E. Clareton: C. G. Glasscock and J. C. Baldwin 1 Grieves, SW SW NW 32-42n-64w. Dry. TD 6,175 ft. Morrison 6,140 ft.

COLORADO

Adams County: Petroleum Inc. 1 Hough, NE NE SE 12-2s-57w. Dry. TD 5,490 ft. Skull Creek 5,467 ft.

Logan County, Northeast Merino: Trigood Oil 1 Whipple, C SW NE 12-6n-54w. IP: 192 BOPD, "J" sand discovery (new field). "J" sand 4,735 ft. TD 4,832 ft.

McDermott & Barnhart 1 Davidson, C SE NW 26-10n-53w. Dry. TD 5,216 ft. "O" sand 5,185 ft.

Ouray County: Jeffie Stanfield 1 Swanson, C NE NE 15-45n-8w. Temporarily abandoned. TD 608 ft.

Washington County: George Dimock et al 1 Featherstone-Government, C SW SE 30-5n-53w. Dry. TD 5,224 ft. Morrison 5,192 ft.

Weld County: Harry Royster and Rome Oil Co. 1 Littler, C SE SE 34-4n-62w. Dry. TD 6,721 ft. "J" sand 6,658 ft.

MANITOBA

John Lucien 1 Canart, LSD 6, 16-11-29w1. Indicated Miss. oil well. TD 2,570 ft.

J. P. Owen 3-33 Ross V.L.A., LSD 3, 33-15-29w1. Dry. TD 2,160 ft.

SASKATCHEWAN

Wilrich-Trans Era 4 strat test, NE¼ LSD 8, 11-48-24w3. Dry. TD 1,666 ft.

Williston-Swift Current 1-18 Harlow, LSD 1, 18-15-13w3. Dry. TD 3,861 ft.

Shell Oil Co. 17 Wood Mountain, LSD 13, 28-7-9w3. Dry. TD 4,630 ft.

ALBERTA

Mill Creek 5-5 Delburne, LSD 5, 5-38-23w4. Dry. TD 6,210 ft.

Merrill-Calvan-Charter-Scurry 4-14 Grande Prairie, LSD 4, 14-73-7w6. Dry. TD 4,920 ft.

Northern-Greta 6-5 Meadowbrook, LSD 6, 5-64-25w4. Dry. TD 4,450 ft.

Gulf 6-17 Morrin, LSD 6, 17-31-20w4. Dry. TD 6,375 ft.

Socony-Seaboard 16-8 Drayton Valley, LSD 8, 16-49-7w5. Cardium sand oil well. TD 5,750 ft.

Socony-Seaboard 30-2 Violet Grove, LSD 2, 30-48-7w5. Cardium and Viking sand oil well. TD 6,804 ft.

ADVERTISERS IN THIS ISSUE

Aerofin Corporation	127
Aerotec Corporation, The	22
Allis-Chalmers Mfg. Co.	25
American Manufacturing Co. of Texas	5
Baker Oil Tools, Inc.	34
Barton Instrument Corporation	125
Bauer & Black Division of The Kendall Company	19
Beryllium Corporation, The	27
Bethlehem Steel Co.	51
Brodie Co., Inc., Ralph N.	8
Butler Manufacturing Co.	135
Cable Engineering	129
Carlon Products Corporation	17
Caterpillar Tractor Co.	7
Charles Machine Works, The	118
Clark Bros. Co., Division of Dresser Operations, Inc.	10, 11
Classified Advertising	143, 144, 145, 146
Consolidated Engineering Corporation	23
Coppus Engineering Corp.	3
Crane Co.	2
Crose Manufacturing Co., Inc., M. J.	111
Darling Valve and Mfg. Co.	133
Dean Brothers Pumps, Inc.	127
Delta Engineering Corporation	113
Delta Engineering Sales Co.	111
Dowell Incorporated	103
Drilling & Service, Inc.	136
Eastman Chemical Products, Inc.	18
Emsco Manufacturing Company	53
Fairbanks, Morse & Co.	28
France Packing Company	112
Franks Mfg. Corp.	Front Cover
Goodall Rubber Company	100
Grancell, I. H.	117
Guiberson Corporation	29
Gulf Oil Corporation	24
Gustin-Bacon Manufacturing Co.	31
Halliburton Oil Well Cementing Co.	Inside Front Cover, 13
Hazard Wire Rope Division of American Chain & Cable Co., Inc.	Inside Back Cover
Houston Contracting Company	111
Hughes Tool Co.	Back Cover
Inferno Co., The	117, 129
Jet-Lube Inc.	118
Jones & Laughlin Steel Corporation Supply Division	16
Keasbey & Mattison Company	9
Kilbourn Engineering Company, Inc.	114
Klinger Limited, Richard	99
Lane-Wells Company	32
Larkin Packer Company, Inc.	60
Le Roi Company	120, 121
Linde Air Products Company A Division of Union Carbide and Carbon Corp.	20
Lone Star Cement Corporation	36
Macco Oil Tool Co.	105
Manning, Maxwell & Moore, Inc.	15
Mayo Hotel, The	105
McCord Corporation	110
McDonald Company, B. F.	131
National Airoil Burner Co., The	112
National Tank Company	148
Norris Manufacturer, Inc., W. C.	57
Oil and Gas Journal, The	109, 137
Oil Metering and Processing Equipment Corporation	114
Oil Well Supply Co.	4
OPW Corporation	6
Orbit Valve Company	115
Parkersburg Rig & Reel Co.	26
Peerless Supply Co. Inc.	131
Pittsburgh Lectrodryer Corporation	12
Polyken Products Department of the Kendall Company	19
Radio Corporation of America	126
Ratigan, Inc., J. P.	110
Reed Roller Bit Company	83, 84
Republic Steel Corporation	14
Roebling's Sons Company, John A.	94
Ross-Martin Co.	118
Ryerson & Son, Inc., Joseph T.	128
Scott-Rice Company	118
Simpson Painting Co.	110
Smith Oil Tool Co., H. C.	116
Steel Forgings, Inc.	110
Thermix Corporation, The	22
Union Carbide and Carbon Corporation, The Linde Air Products Company	20
United States Rubber Company	21
U. S. Steel Corp. Subsidiaries	4
Universal Atlas Cement Co.	122
Vapor Honing Co., Inc.	110
Viking Pump Co.	28
Well Equipment Mfg. Corp.	30
Willson Products, Inc.	105
Wood's Sons Co., T. B.	118
Youngstown Sheet and Tube Company	55

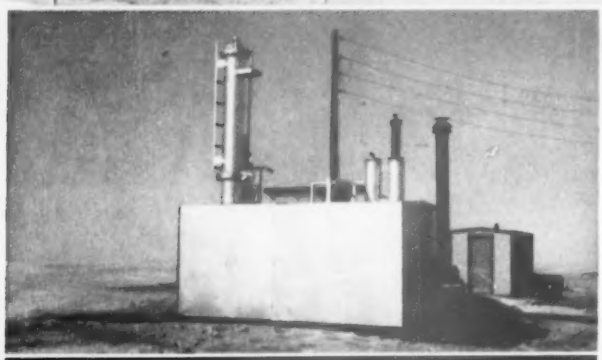
LEGAL

Sealed bids for Oil and Gas Mining leases on restricted Allotted lands of the Fort Berthold Indian Reservation, North Dakota, will be received at the Office of the Superintendent of the said reservation, New Town, North Dakota, until 2:00 P.M., Central Standard Time on February 16, 1954, and will be opened immediately thereafter in the presence of such bidders as may attend. The total allotted land covered by the advertisement is 35,654.48 acres. All of this land is located in the counties of Dunn and McKenzie, State of North Dakota. For additional information write the superintendent of the Fort Berthold Agency, New Town, North Dakota, or call the Agency Land Office, Phone 654, New Town. Ralph M. Shane, Acting Superintendent.

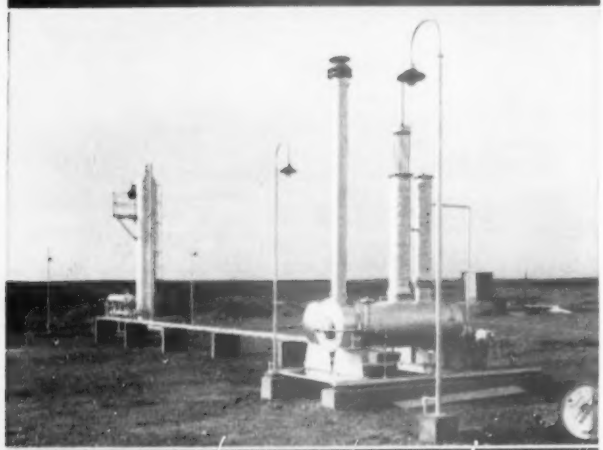
LEGAL

U.S. DEPARTMENT OF THE INTERIOR. Bureau of Land Management, Washington 25, D.C. Notice is hefeby given that approximately 400 acres of land in three parcels, Parcel #1, T. 35 N., R. 2W., sec. 17, W½SE¼, sec. 20, NW¼NE¼, total 120 acres; Parcel #2, T. 35 N., R. 2W., sec. 33, W½SW¼, NE¼SW¼, total 200 acres; Parcel #3, T. 34 N., R. 3 W., sec. 1, E½SE¼, total 80 acres, within the known geological structure of the Kevin-Sunburst field, Montana, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., Eastern Standard Time, February 10, 1954, when bids will be opened. Details of the lease offering, how and where to submit bids, may be obtained from the Bureau's Washington office. L. E. Hoffman, Chief, Division of Minerals.

NATIONAL GLYCOL DEHYDRATION AND LOW TEMPERATURE EXTRACTION (LTX®) Equipment



National 500 mcf/day, 125 # WP Glycol Dehydrator — N. Dakota



National 17 mmcf/day, 1000 # WP Glycol Dehydrator — Kansas

A 30" x 12½', 1200 psi LTX with Glycol Injection and a 24" x 15', 300 psi Stabilizing Desorber for 10,000 mcf per day operating on lease in South Texas.

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What do Your Lines Cost on a TON-MILE BASIS?

• You hear a lot about wire rope costs these days, particularly the first cost. But you don't know how much a line really costs you until you scrap it—and—until you figure your cost per ton-mile.

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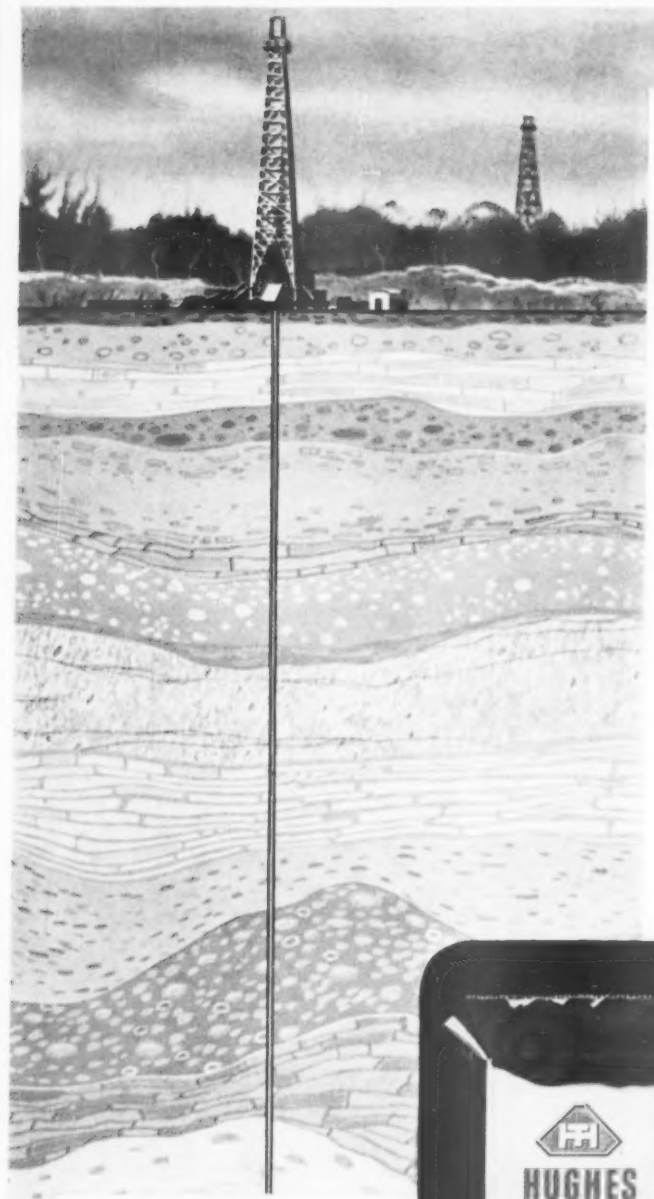

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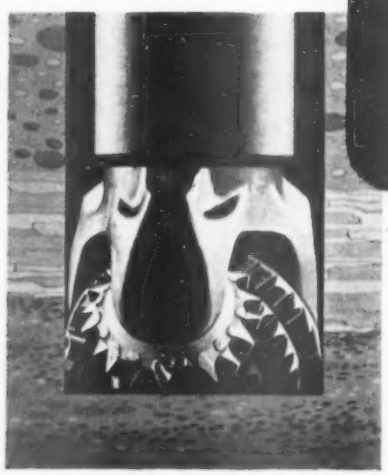
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